

SARDINE EGGS AND LARVAE AND OTHER FISH LARVAE, PACIFIC COAST, 1955



SPECIAL SCIENTIFIC REPORT-FISHERIES No. 224

**UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE**

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United States Department of the Interior, Fred A. Seaton, Secretary
Fish and Wildlife Service

SARDINE EGGS AND LARVAE AND OTHER FISH LARVAE
PACIFIC COAST, 1955

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Special Scientific Report--Fisheries No. 224

Washington, D. C.

July 1957

ABSTRACT

This report contains the results of quantitative sampling of fish eggs and larvae off the coasts of California and Baja California during 1955. The eggs and larvae are sampled in quantitative plankton hauls taken over a grid of stations that usually are occupied at monthly intervals.

Eggs and larvae are reported for the Pacific sardine (Sardinops caerulea), and larvae alone for the northern anchovy (Engraulis mordax), jack mackerel (Trachurus symmetricus), Pacific mackerel (Pneumatophorus diego), hake (Merluccius productus) and rockfish (Sebastes spp.). The report includes charts showing the distribution and relative abundance in 1955 of each of the above species, except rockfish, and brief descriptive accounts of each.

SARDINE EGGS AND LARVAE AND
OTHER FISH LARVAE, PACIFIC COAST, 1955

This report, the sixth in a continuing yearly series, contains the results of quantitative sampling of fish eggs and larvae off the coasts of California and Baja California during 1955. The species reported upon are the following: Pacific sardine (Sardinops caerulea), northern anchovy (Engraulis mordax), jack mackerel (Trachurus symmetricus), Pacific mackerel (Pneumatophorus diego), hake (Merluccius productus), and rockfish (Sebastes spp.). The preceding reports in the series are listed in the bibliography.

The fish eggs and larvae were obtained in quantitative plankton hauls taken on biological-oceanographic cruises by agencies participating in the California Cooperative Oceanic Fisheries Investigations. The investigations are sponsored by the California Marine Research Committee and are carried out cooperatively by the South Pacific Fishery Investigations of the U. S. Fish and Wildlife Service, the Scripps Institution of Oceanography of the University of California, the Hopkins Marine Station of Stanford University, the California Department of Fish and Game, and the California Academy of Sciences.

As in previous reports, the data are presented in eight tables:

- I. Standardized haul factors for plankton hauls taken on regular survey cruises during 1955
- II. Sardine eggs, reported by age
- III. Sardine larvae, reported by size
- IV. Anchovy larvae, reported by size
- V. Jack mackerel larvae, reported by size
- VI. Pacific mackerel larvae, reported by size
- VII. Hake larvae
- VIII. Rockfish larvae.

The eight tables of basic data are designated by Roman numerals. A number of text tables are also included in this report: these are designated by Arabic numerals. An innovation in the present report is the inclusion of charts showing the distribution and abundance in 1955 of each of the above categories, except rockfish. Each section is also preceded by a brief descriptive account.

It is with deep pleasure that we acknowledge the cooperation given by the Scripps Institution of Oceanography in the collection of data at sea. Most personnel of the South Pacific Fishery Investigations contributed to this project, many devoting their full time to it. Robert Counts and Lois Hunter aided in the identifications, enumerations and measurements; James Thraillkill supervised the separation of fish eggs and larvae from plankton collections, and also prepared the charts included in this report.

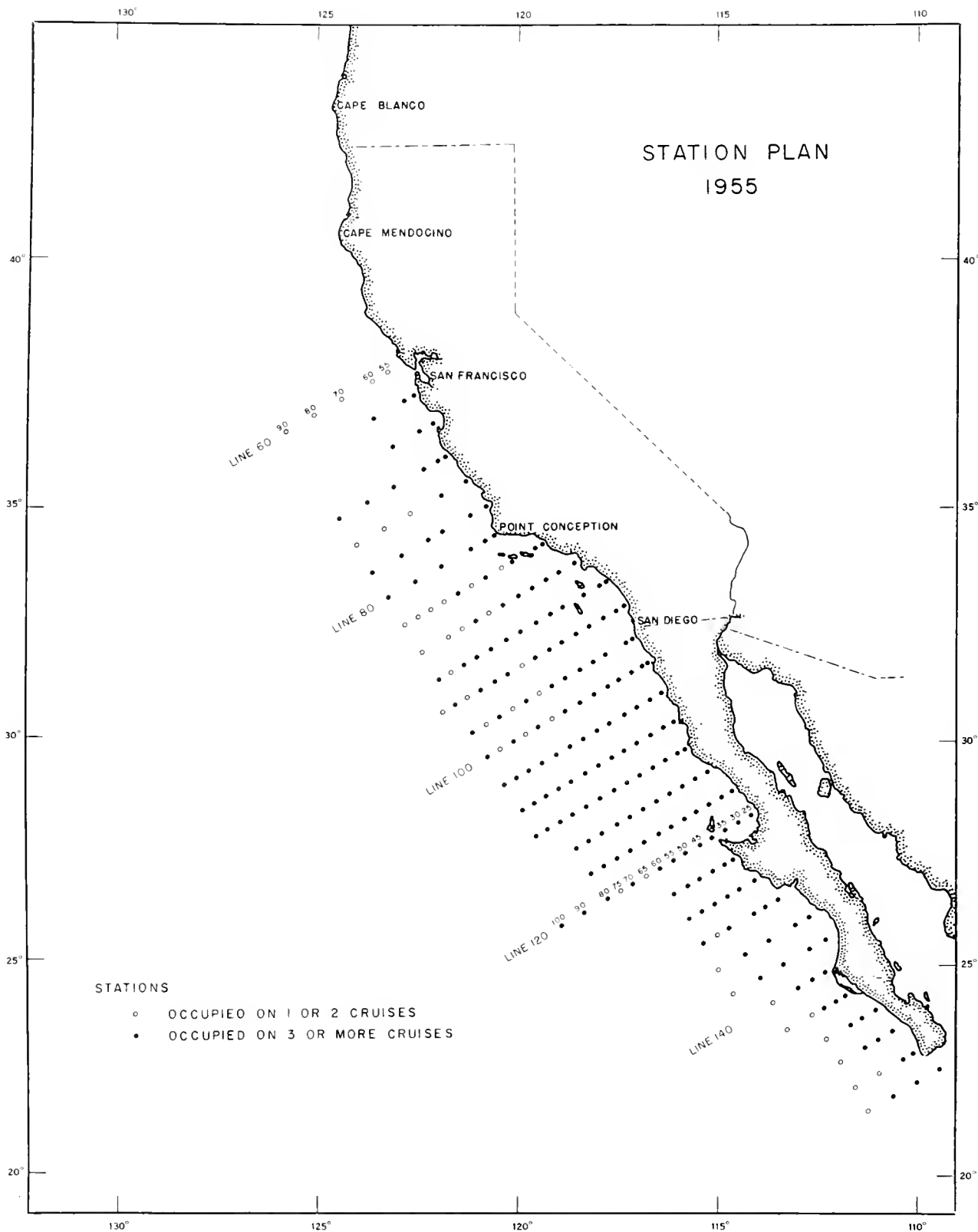


Figure 1.--Station plan, 1955, of the California Cooperative Oceanic Fisheries Investigations

AREA COVERED

The regular survey cruises of 1955 covered the area between San Francisco, California, and Cape San Lucas, Baja California (station lines 60-157). A much more extensive coverage was obtained on "Norpac" (cruise 5508), but the results of this cruise are not included in the present report. The monthly coverage during 1955 is summarized in text table 1. The stations occupied on regular survey cruises are shown in figure 1. On cruises 5509 and 5511, an area off southern California was surveyed intensively (table I, supplement). This area was covered four times on cruise 5509, twice on cruise 5511. Only a portion of the collections made during these two cruises is included in tables II to VIII.

Text table 1.--Coverage during 1955

| Month | Cruise number | Station lines occupied | Number of stations occupied |
|-----------|---------------|-------------------------|-----------------------------|
| January | 5501 | 80 to 157 | 112 |
| February | 5502 | 80 to 157 | 117 |
| March | 5503 | 80 to 157 | 142 |
| April | 5504 | 80 to 137 | 134 |
| May | 5505 | 63 to 137 | 184 |
| June | 5506 | 60 to 137 | 189 |
| July | 5507 | 63 to 137 | 196 |
| August | 5508 | "Norpac" - not included | |
| September | 5509 | 83 to 90 | 43 |
| October | 5510 | 60 to 137 | 109 |
| November | 5511 | 83 to 90 | 43 |
| December | 5512 | 80 to 150 | 106 |
| Total | | 60 to 157 | <u>1375</u> |

METHODS OF SAMPLING

The procedures followed in taking plankton hauls are similar to those outlined in previous reports in this series. Refer particularly to Ahlstrom (1952: 3-6) and Ahlstrom (1953: 4-7).

The nets are hauled obliquely from approximately 140 meters in depth to the surface (200 meters of wire out at greatest depth), except at shallow stations. The hauls are made at a vessel speed of between one and two knots. The angle of stray of the towing wire is measured continuously during a haul by means of an inclinometer suspended from the boom and riding freely on the wire. We have verified by use of a depth flow unit, that the depth of the plankton net at any instant during a haul can be approximated by multiplying the amount of towing wire out by the cosine of the angle of stray of the towing wire from the vertical.

RECORD OF STANDARDIZED HAUL FACTORS FOR OBLIQUE HAULS
MADE WITH PLANKTON NETS DURING CRUISES 5501-5512, 1955

The number of fish eggs or larvae in a haul is adjusted to the number under 10 square meters of sea surface. This estimate is a valid one if the vertical distribution of eggs and larvae has been encompassed. For all species included in this report, except hake larvae, this requirement has been met. Routine plankton hauls average between 130 and 140 meters deep. From vertical distribution studies, we have established that larvae (and eggs) of the sardine, anchovy, jack mackerel, Pacific mackerel and rockfish seldom occur as deep as 100 meters, hence the layer sampled in taking a plankton haul is ordinarily at least 30 or 40 meters deeper than the depth distribution of the larvae. About 10% of hake larvae taken in special vertical distribution studies was taken below 140 meters; therefore, the abundance of hake larvae is probably underestimated by this amount.

A standardized haul factor is given for all plankton hauls taken on routine cruises during 1955 (except "Norpac"). Additional information on these hauls, including position, date and time of collection, volume of water strained, and depth of haul in meters, has been given in "Zooplankton volumes off the Pacific coast, 1955" (Special Scientific Report - Fisheries No. 177).

A dash (-) in table I indicates that the station was not occupied on the cruise under which it appears; N.Q. - haul not quantitative; N.S. - station occupied, but sample either not obtained or subsequently spoiled, broken, or lost; S.T. - only surface tow taken.

A measure of the volume of water strained during each haul was derived from current meter readings. An Atlas-type current meter was fastened in the center of the mouth of each net. The meters were calibrated before and after each cruise on which they were used.

Plankton nets used during 1955 were either constructed of No. 30xxx grit gauze, a heavy grade of silk bolting cloth, or No. 471 "Nitex", a nylon monofilament screen cloth. The mesh openings in the Nitex cloth measure approximately 471 microns. This cloth has been subjected to a thermosetting operation which imparts a permanent crimp to the fabric, giving it good stability. The mesh openings in the nets constructed of grit gauze are slightly larger than in the nets constructed of Nitex, however the grit gauze shrinks on use to approximately 0.55 mm. between threads, while the mesh openings in Nitex tend to enlarge slightly. Nets constructed of silk grit gauze are more easily cleaned and clog less than nylon nets, but they have a considerably shorter life.

Table I
Record of Standardized Haul Factors for Oblique Hauls
made with Plankton Nets during Cruises 5501-5512, 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|-------|------------------|------|------|------|------|------|------|------|-------|------|------|------|
| | 5501 | 5502 | 5503 | 5504 | 5505 | 5506 | 5507 | 5508 | 5509 | 5510 | 5511 | 5512 |
| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
| 60.55 | - | - | - | - | - | 2.55 | - | - | - | 2.91 | - | - |
| .60 | - | - | - | - | - | 3.92 | - | - | - | 3.18 | - | - |
| .70 | - | - | - | - | - | 3.28 | - | - | - | 2.79 | - | - |
| .80 | - | - | - | - | - | 3.94 | - | - | - | 2.90 | - | - |
| .90 | - | - | - | - | - | 3.27 | - | - | - | 3.03 | - | - |
| 63.52 | - | - | - | - | 3.15 | 4.49 | 2.54 | - | - | 2.19 | - | - |
| .55 | - | - | - | - | 2.35 | 3.14 | 2.48 | - | - | 2.69 | - | - |
| .65 | - | - | - | - | 2.65 | 2.66 | 3.36 | - | - | - | - | - |
| 67.50 | - | - | - | - | 1.74 | 3.28 | 1.53 | - | - | 2.49 | - | - |
| .55 | - | - | - | - | 2.56 | 3.39 | 2.90 | - | - | 2.58 | - | - |
| .65 | - | - | - | - | 2.73 | 2.84 | 3.24 | - | - | - | - | - |
| 70.52 | - | - | - | - | 2.66 | 2.64 | 3.22 | - | - | 2.94 | - | - |
| .55 | - | - | - | - | 3.00 | 2.70 | 2.91 | - | - | 2.82 | - | - |
| .60 | - | - | - | - | 2.94 | 2.95 | 3.27 | - | - | 3.27 | - | - |
| .70 | - | - | - | - | 2.97 | 3.14 | 2.32 | - | - | 3.32 | - | - |
| .80 | - | - | - | - | - | 3.23 | 2.97 | - | - | 3.04 | - | - |
| .90 | - | - | - | - | - | 2.74 | 2.22 | - | - | 3.06 | - | - |
| 73.50 | - | - | - | - | - | 3.18 | 2.96 | - | - | 2.89 | - | - |
| .60 | - | - | - | - | - | 2.68 | 2.39 | - | - | 2.88 | - | - |
| .70 | - | - | - | - | - | 2.98 | 2.60 | - | - | - | - | - |
| .80 | - | - | - | - | - | 2.86 | 3.12 | - | - | - | - | - |
| .90 | - | - | - | - | - | 3.43 | 3.81 | - | - | - | - | - |
| 77.50 | - | - | - | - | 2.41 | 3.15 | 2.60 | - | - | 2.81 | - | - |
| .55 | - | - | - | - | 2.72 | 3.20 | 3.59 | - | - | 2.93 | - | - |
| .65 | - | - | - | - | 2.53 | 3.12 | 4.30 | - | - | - | - | - |
| .70 | - | - | - | - | 2.84 | 3.49 | 3.46 | - | - | - | - | - |
| .80 | - | - | - | - | 3.90 | 2.65 | 2.73 | - | - | - | - | - |
| .90 | - | - | - | - | 2.70 | 3.64 | 3.14 | - | - | - | - | - |
| 80.51 | 2.76 | - | 1.56 | 3.40 | 5.47 | 3.47 | 2.45 | - | - | 2.52 | - | 2.42 |
| .55 | 3.11 | 3.23 | 4.36 | 3.28 | 2.76 | 3.65 | 3.16 | - | - | 2.61 | - | 2.86 |
| .60 | 3.19 | 2.25 | 2.37 | 3.06 | 2.82 | 2.90 | 3.67 | - | - | 2.86 | - | 2.57 |
| .70 | 2.74 | 2.66 | 2.54 | 3.00 | 2.74 | 2.94 | 3.28 | - | - | 2.31 | - | 2.62 |
| .80 | 3.13 | 2.86 | 2.85 | 2.79 | 2.81 | 2.62 | 2.97 | - | - | 3.44 | - | 2.47 |
| .90 | - | - | - | 2.67 | 3.14 | 3.19 | 2.77 | - | - | 2.88 | - | 2.84 |
| 83.40 | 1.69 | 2.31 | 1.25 | S.T. | 2.07 | 1.52 | 1.54 | - | * | 1.25 | * | 1.12 |
| .43 | 3.29 | 3.26 | 3.39 | 2.49 | 2.44 | 3.07 | 2.69 | - | - | 2.75 | - | 2.72 |
| .51 | 2.80 | 2.76 | 3.02 | 2.89 | 2.95 | 2.43 | 2.70 | - | * | 2.81 | * | 3.37 |
| .55 | - | - | - | - | - | 3.05 | 2.89 | - | * | - | * | - |

1/ Cruise 5508 - "Norpac" - to be published separately

* See Table I, Supplement

Table I (Cont'd)
Record of Standardized Haul Factors for Oblique Hauls
made with Plankton Nets during Cruises 5501-5512, 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|-------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 83.60 | 3.13 | 3.23 | 2.73 | 3.03 | 3.12 | 3.61 | 2.31 | - | * | 2.77 | * | 2.89 |
| .65 | - | - | - | - | - | 2.51 | 5.07 | - | - | - | - | - |
| .70 | - | - | - | 2.74 | 2.92 | 3.02 | 3.01 | - | - | - | - | - |
| .75 | - | - | - | - | - | 3.46 | - | - | - | - | - | - |
| .80 | - | - | - | 2.97 | - | 3.31 | - | - | - | - | - | - |
| .85 | - | - | - | - | - | 3.12 | - | - | - | - | - | - |
| .90 | - | - | - | 2.60 | - | 2.91 | - | - | - | - | - | - |
| 87.35 | 2.26 | 3.04 | 2.37 | 2.80 | 2.45 | 2.93 | 2.64 | - | * | 2.37 | * | 2.36 |
| .40 | 2.65 | 2.93 | 2.92 | 2.36 | 3.19 | 2.49 | 2.28 | - | * | 2.84 | * | 2.25 |
| .45 | - | - | - | - | 2.37 | 2.59 | 2.95 | - | * | 2.61 | * | - |
| .50 | 2.89 | 2.85 | 2.39 | 2.39 | 2.61 | 3.01 | 2.56 | - | * | 2.09 | * | 3.13 |
| .55 | - | - | - | - | 2.63 | 3.09 | 2.69 | - | * | - | * | - |
| .60 | 3.83 | 3.05 | - | 2.69 | 3.10 | 3.61 | 3.23 | - | * | 2.49 | * | 3.08 |
| .65 | - | - | - | - | - | 3.21 | 2.75 | - | - | - | - | - |
| .70 | - | - | - | 3.03 | - | 3.71 | 2.77 | - | - | - | - | - |
| .75 | - | - | - | - | - | 4.35 | - | - | - | - | - | - |
| .80 | - | - | - | 3.10 | - | 3.26 | - | - | - | - | - | - |
| .85 | - | - | - | - | - | N.Q. | - | - | - | - | - | - |
| .90 | - | - | - | 2.95 | - | 2.89 | - | - | - | - | - | - |
| 90.28 | 2.74 | 2.52 | 1.84 | S.T. | 2.72 | 2.52 | 2.76 | - | * | 2.64 | * | 2.44 |
| .30 | 2.26 | 3.11 | 2.73 | 2.56 | 2.89 | 2.98 | 1.90 | - | * | 2.48 | * | 2.40 |
| .37 | 3.12 | 2.97 | 2.52 | 2.79 | 2.65 | 2.66 | 3.21 | - | * | 2.51 | * | 2.58 |
| .45 | 3.74 | 3.12 | 2.92 | 2.90 | 2.78 | 4.13 | 3.22 | - | * | 2.69 | * | 3.00 |
| .50 | 2.61 | N.Q. | 2.87 | 3.05 | 2.90 | 2.91 | 2.12 | - | * | - | * | - |
| .55 | - | - | - | - | 2.96 | 2.81 | 2.68 | - | * | 2.83 | * | 2.84 |
| .60 | 2.72 | 2.94 | 2.91 | 2.70 | 2.70 | 3.32 | 2.79 | - | - | 2.88 | - | 2.70 |
| .65 | - | - | - | - | 2.86 | 3.46 | 3.00 | - | - | - | - | - |
| .70 | 2.85 | 3.23 | 2.91 | 2.45 | 3.03 | 2.75 | 2.50 | - | - | 3.03 | - | 2.70 |
| .75 | - | - | - | - | 3.08 | 2.60 | 2.59 | - | - | - | - | - |
| .80 | - | - | 3.10 | 3.47 | 3.02 | - | 2.10 | - | - | 2.99 | - | 2.91 |
| .85 | - | - | - | - | 2.94 | - | 3.19 | - | - | - | - | - |
| .90 | - | - | 3.07 | 2.67 | 2.88 | - | 3.53 | - | - | 2.52 | - | - |
| 93.27 | 3.47 | 1.75 | 1.75 | 2.68 | 3.23 | 2.26 | 2.36 | - | - | 2.48 | - | 2.56 |
| .30 | 3.44 | 2.66 | 2.88 | 2.60 | 3.03 | 2.22 | 2.92 | - | - | 2.91 | - | 2.53 |
| .35 | - | - | - | - | 3.03 | 3.10 | 2.00 | - | - | - | - | - |
| .40 | 2.95 | 2.81 | 2.69 | 3.23 | 2.81 | 2.97 | 3.13 | - | - | 2.71 | - | 2.27 |
| .45 | - | - | - | - | 3.13 | 2.89 | 2.43 | - | - | - | - | - |
| .50 | 2.98 | 3.06 | 3.31 | 3.09 | 3.08 | 2.80 | 2.83 | - | - | 2.89 | - | 2.97 |
| .55 | - | - | - | - | 3.08 | 2.51 | 2.55 | - | - | - | - | - |
| .60 | - | - | 2.68 | 2.84 | 3.06 | 2.74 | 2.78 | - | - | 2.77 | - | - |
| .65 | - | - | - | - | 2.81 | N.Q. | 2.12 | - | - | - | - | - |

Table I (Cont'd)
Record of Standardized Haul Factors for Oblique Hauls
made with Plankton Nets during Cruises 5501-5512, 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 93.70 | - | - | 3.45 | 2.36 | 2.98 | 2.56 | 2.65 | - | - | - | - | - |
| .75 | - | - | - | - | 2.96 | 2.74 | 2.78 | - | - | - | - | - |
| .80 | - | - | - | 2.82 | 2.28 | 3.04 | 2.66 | - | - | - | - | - |
| .85 | - | - | - | - | 2.78 | - | 3.30 | - | - | - | - | - |
| .90 | - | - | - | 2.84 | 2.75 | - | 2.64 | - | - | - | - | - |
| .95 | - | - | - | - | 2.80 | - | - | - | - | - | - | - |
| 97.30 | 1.86 | 2.53 | 2.60 | 2.49 | 2.55 | 2.53 | 1.72 | - | - | 2.46 | - | 2.34 |
| .32 | 2.59 | 2.55 | 3.06 | 3.12 | 3.16 | 2.74 | 2.77 | - | - | 2.67 | - | 3.06 |
| .35 | - | - | - | - | 2.79 | 2.60 | 3.12 | - | - | - | - | - |
| .40 | 3.43 | 3.13 | 2.24 | 2.52 | 2.98 | 2.79 | 2.65 | - | - | 3.09 | - | 2.88 |
| .45 | - | - | - | - | 3.31 | 3.11 | 3.01 | - | - | - | - | - |
| .50 | 3.23 | 3.12 | 2.29 | 2.74 | 3.31 | 2.05 | 3.31 | - | - | 2.66 | - | 3.19 |
| .55 | - | - | - | - | 3.23 | 2.52 | 3.21 | - | - | - | - | - |
| .60 | - | - | 2.64 | 3.01 | 3.83 | - | 2.86 | - | - | 3.00 | - | - |
| .65 | - | - | - | - | 3.70 | - | 3.04 | - | - | - | - | - |
| .70 | - | - | 2.35 | 3.19 | 3.48 | - | 3.42 | - | - | - | - | - |
| .75 | - | - | - | - | 3.06 | - | 2.73 | - | - | - | - | - |
| .80 | - | - | - | 2.85 | 4.17 | - | 3.03 | - | - | - | - | - |
| .85 | - | - | - | - | 3.75 | - | 2.86 | - | - | - | - | - |
| .90 | - | - | - | 2.42 | 3.47 | - | 3.06 | - | - | - | - | - |
| 100.29 | 2.91 | 2.78 | 1.52 | 3.40 | 3.19 | 2.55 | 3.18 | - | - | 2.28 | - | 2.81 |
| .30 | 2.94 | 2.79 | 2.75 | 2.50 | 3.21 | 2.81 | 2.97 | - | - | 3.22 | - | 2.72 |
| .35 | - | - | - | - | 3.10 | 2.96 | 2.83 | - | - | - | - | - |
| .40 | 2.96 | 2.89 | 2.62 | 2.44 | 2.83 | 3.44 | 2.33 | - | - | 2.54 | - | 3.04 |
| .45 | - | - | - | - | 3.07 | 2.95 | 3.17 | - | - | - | - | - |
| .50 | 3.16 | 3.03 | 3.00 | 3.15 | 3.80 | 2.23 | 2.48 | - | - | 2.98 | - | 2.28 |
| .55 | - | - | - | - | 2.59 | 2.41 | 2.70 | - | - | - | - | - |
| .60 | 3.49 | 3.01 | 3.44 | 2.89 | 3.17 | - | 3.40 | - | - | 3.05 | - | 2.44 |
| .65 | - | - | - | - | 2.97 | - | 2.98 | - | - | - | - | - |
| .70 | 2.78 | 3.45 | 2.90 | 2.86 | 2.71 | - | 2.87 | - | - | 2.33 | - | 2.93 |
| .75 | - | - | - | - | 2.83 | - | 2.65 | - | - | - | - | - |
| .80 | 3.49 | 2.92 | 3.46 | 2.75 | 3.03 | - | 2.92 | - | - | 2.16 | - | 2.97 |
| .85 | - | - | - | - | 3.23 | - | 3.07 | - | - | - | - | - |
| .90 | - | - | 3.40 | 3.65 | 3.11 | - | 3.02 | - | - | 2.90 | - | - |
| 103.30 | 2.21 | 2.33 | 2.21 | 2.51 | 3.05 | 1.84 | 2.30 | - | - | 2.02 | - | 1.74 |
| .35 | 2.89 | 3.26 | 3.30 | 3.69 | 3.07 | 2.31 | 2.86 | - | - | 2.84 | - | 3.01 |
| .40 | 2.87 | 3.45 | 2.99 | 2.94 | 3.16 | 2.89 | 2.67 | - | - | 3.30 | - | 3.02 |
| .45 | - | - | - | 2.60 | 2.86 | 2.96 | 3.32 | - | - | - | - | - |
| .50 | 3.53 | 3.43 | 3.35 | 2.85 | 3.23 | 2.57 | 3.22 | - | - | - | - | 3.17 |
| .55 | - | - | - | 2.99 | 3.23 | 2.56 | 3.11 | - | - | - | - | - |
| .60 | 3.02 | 2.92 | 2.74 | 2.79 | 3.10 | 2.88 | 2.80 | - | - | - | - | 2.77 |

Table I (Cont'd)
Record of Standardized Haul Factors for Oblique Hauls
made with Plankton Nets during Cruises 5501-5512, 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 103.65 | - | - | - | 2.75 | 3.34 | 1.48 | 2.52 | - | - | - | - | - |
| .70 | - | - | 2.44 | 2.57 | 2.89 | 2.87 | 2.96 | - | - | - | - | - |
| .75 | - | - | - | 2.82 | 3.10 | 2.60 | 2.91 | - | - | - | - | - |
| .80 | - | - | - | 3.36 | 2.99 | 2.28 | 2.82 | - | - | - | - | - |
| .85 | - | - | - | - | 3.10 | 2.87 | 2.41 | - | - | - | - | - |
| .90 | - | - | - | - | 3.17 | 3.23 | 3.36 | - | - | - | - | - |
| 107.32 | 2.01 | 2.97 | 3.36 | 3.64 | 3.30 | 3.11 | 2.79 | - | - | 2.57 | - | 2.71 |
| .35 | 3.24 | 3.29 | 3.45 | 2.69 | 3.11 | 3.12 | 2.80 | - | - | 1.94 | - | 3.11 |
| .40 | 3.06 | 3.33 | 2.91 | 4.23 | 2.47 | 1.86 | 2.60 | - | - | 3.73 | - | 2.59 |
| .45 | - | - | - | - | 3.06 | 2.81 | 3.36 | - | - | - | - | - |
| .50 | 3.53 | 3.32 | 3.47 | 3.17 | 3.09 | 3.20 | 3.02 | - | - | - | - | 2.72 |
| .55 | - | - | - | - | 2.71 | 1.91 | 3.24 | - | - | - | - | - |
| .60 | 2.93 | 2.98 | 3.20 | 2.39 | 2.79 | 2.64 | 3.19 | - | - | - | - | 2.87 |
| .65 | - | - | - | - | 3.10 | 2.78 | 3.12 | - | - | - | - | - |
| .70 | - | - | 2.65 | 2.91 | 3.15 | 2.32 | 2.98 | - | - | - | - | - |
| .75 | - | - | - | - | 3.03 | 2.59 | 2.74 | - | - | - | - | - |
| .80 | - | - | - | 3.07 | 2.86 | 2.91 | 3.29 | - | - | - | - | - |
| .85 | - | - | - | - | 3.09 | 3.15 | 2.85 | - | - | - | - | - |
| .90 | - | - | - | - | 3.00 | 2.46 | 2.59 | - | - | - | - | - |
| 110.33 | 2.67 | 2.95 | 2.47 | 3.14 | 2.79 | 1.29 | 2.93 | - | - | 1.92 | - | 2.32 |
| .35 | 2.15 | 3.21 | 3.05 | 2.00 | 3.07 | 2.10 | 2.62 | - | - | 2.76 | - | 2.57 |
| .40 | 2.85 | 3.25 | 3.22 | 3.71 | 3.18 | 3.09 | 2.89 | - | - | 3.77 | - | 3.70 |
| .45 | - | - | - | - | 2.94 | 2.16 | 3.19 | - | - | - | - | - |
| .50 | 2.80 | 3.28 | 2.80 | 3.54 | 2.86 | 2.63 | 3.74 | - | - | 2.43 | - | 2.93 |
| .55 | - | - | - | - | 2.62 | 2.40 | 2.77 | - | - | - | - | - |
| .60 | 2.91 | 3.05 | 3.38 | 2.51 | 3.17 | 3.16 | 2.67 | - | - | 3.05 | - | 2.36 |
| .65 | - | - | - | - | 3.08 | 2.43 | 2.55 | - | - | - | - | - |
| .70 | 2.70 | 2.80 | 3.27 | 2.64 | 3.08 | 2.51 | 2.63 | - | - | 2.37 | - | 2.62 |
| .75 | - | - | - | - | 2.91 | 2.50 | 2.79 | - | - | - | - | - |
| .80 | 3.10 | 3.36 | 2.95 | 2.32 | 2.73 | 3.05 | 2.60 | - | - | 2.92 | - | 3.00 |
| .85 | - | - | - | - | 3.05 | 2.11 | 2.86 | - | - | - | - | - |
| .90 | - | - | 3.46 | 3.06 | 2.63 | 2.88 | 2.83 | - | - | 2.71 | - | - |
| 113.30 | 2.26 | 2.60 | 2.98 | 1.97 | 2.39 | 1.55 | 2.67 | - | - | 4.84 | - | 2.45 |
| .35 | 2.90 | 3.16 | 2.42 | 3.77 | 3.33 | 2.25 | 3.22 | - | - | 3.71 | - | 2.12 |
| .40 | 2.73 | 2.97 | 3.15 | 2.66 | 3.26 | 3.07 | 2.81 | - | - | 3.11 | - | 2.65 |
| .45 | - | 3.06 | 3.23 | 3.04 | 3.17 | 2.40 | 2.86 | - | - | - | - | - |
| .50 | 2.75 | 3.70 | 3.13 | 3.19 | 2.83 | 3.07 | 3.28 | - | - | - | - | 2.45 |
| .55 | - | 3.35 | 3.28 | 2.88 | 3.02 | 2.40 | 2.56 | - | - | - | - | - |
| .60 | 3.02 | 3.35 | 3.46 | 2.72 | 3.02 | 2.91 | 2.58 | - | - | - | - | 2.64 |
| .65 | - | - | - | - | 3.11 | 2.60 | 2.70 | - | - | - | - | - |
| .70 | - | 3.06 | 3.88 | 3.64 | 3.71 | 3.01 | 3.01 | - | - | - | - | 2.86 |

Table I (Cont'd)
Record of Standardized Haul Factors for Oblique Hauls
made with Plankton Nets during Cruises 5501-5512, 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 113.75 | - | - | - | - | 2.95 | 2.86 | 2.65 | - | - | - | - | - |
| .80 | - | - | - | 2.76 | 3.26 | 3.22 | 2.67 | - | - | - | - | - |
| 117.26 | 3.24 | 2.83 | 3.27 | 1.78 | 3.11 | 1.60 | 2.19 | - | - | 1.44 | - | 2.93 |
| .30 | 2.90 | 3.37 | 3.14 | 2.56 | 3.16 | 2.91 | 3.30 | - | - | 2.40 | - | 2.94 |
| .35 | 3.17 | 3.35 | 3.61 | 3.21 | 2.68 | 1.79 | 2.78 | - | - | 3.38 | - | 3.20 |
| .40 | 2.93 | 4.00 | 3.36 | 2.64 | 3.29 | 2.66 | 2.45 | - | - | 3.28 | - | 2.99 |
| .45 | - | 3.46 | 3.23 | 3.07 | 2.45 | 2.90 | 2.61 | - | - | - | - | - |
| .50 | 3.20 | 3.14 | 3.08 | 3.65 | 2.23 | 2.32 | 2.54 | - | - | - | - | 2.63 |
| .55 | - | 3.40 | 2.76 | 2.87 | 3.18 | 3.00 | 2.48 | - | - | - | - | - |
| .60 | 3.70 | 3.32 | 3.84 | 2.91 | 2.83 | 3.35 | 2.78 | - | - | - | - | 2.68 |
| .65 | - | - | - | - | 3.09 | 2.77 | 2.71 | - | - | - | - | - |
| .70 | - | 3.67 | 3.24 | 3.51 | 2.69 | 3.31 | 2.76 | - | - | - | - | 2.88 |
| .75 | - | - | - | - | 2.80 | 2.38 | 2.44 | - | - | - | - | - |
| .80 | - | - | - | 2.12 | 2.59 | 1.77 | 3.00 | - | - | - | - | - |
| 120.25 | 2.66 | 2.91 | 3.16 | 2.45 | 2.77 | 2.09 | 2.02 | - | - | 2.88 | - | 2.39 |
| .27 | - | - | - | - | 3.31 | 2.22 | - | - | - | 2.38 | - | - |
| .30 | 3.13 | 3.41 | 3.19 | 2.98 | 2.28 | 2.12 | 2.37 | - | - | 2.02 | - | 2.70 |
| .35 | 2.92 | 3.05 | 3.49 | 3.65 | 2.95 | 1.70 | 2.88 | - | - | 2.10 | - | 2.53 |
| .40 | 2.32 | 2.67 | 2.71 | 2.26 | 2.31 | 1.95 | 2.30 | - | - | - | - | 1.63 |
| .45 | 3.08 | 2.23 | 3.03 | 2.48 | 3.07 | 2.47 | 3.01 | - | - | 2.35 | - | 2.89 |
| .50 | 3.30 | 3.60 | 2.78 | 3.80 | 2.99 | 2.99 | 3.00 | - | - | 3.48 | - | 2.71 |
| .55 | - | 3.65 | 3.03 | 2.29 | 2.83 | 3.10 | 2.82 | - | - | - | - | 2.72 |
| .60 | 3.08 | 2.70 | 2.91 | 2.85 | N.S. | 3.23 | 2.74 | - | - | 2.72 | - | 2.72 |
| .65 | - | - | - | 2.83 | - | - | - | - | - | - | - | - |
| .70 | 3.31 | 3.07 | 2.98 | 2.66 | 3.22 | 3.66 | 2.64 | - | - | 1.97 | - | 2.52 |
| .75 | - | - | - | 2.49 | - | - | - | - | - | - | - | - |
| .80 | 3.15 | 2.37 | 3.16 | 3.43 | 2.74 | 2.69 | 3.10 | - | - | 2.52 | - | - |
| .90 | 2.76 | 2.22 | 3.18 | - | - | - | - | - | - | 2.65 | - | - |
| .100 | 2.85 | 2.80 | 2.82 | - | - | - | - | - | - | - | - | - |
| 123.37 | 2.82 | 1.67 | 2.02 | 2.57 | N.Q. | 2.36 | 3.50 | - | - | 3.00 | - | 2.62 |
| .40 | 3.13 | 2.26 | 3.41 | 2.37 | 2.45 | 2.12 | 3.16 | - | - | 2.22 | - | 3.47 |
| .45 | 3.19 | 3.18 | 2.94 | 2.71 | 2.39 | 3.32 | 2.95 | - | - | - | - | - |
| .50 | 3.09 | 3.41 | 1.77 | 2.96 | 3.14 | 2.97 | 2.97 | - | - | 2.95 | - | 2.96 |
| .55 | 3.41 | 1.98 | 2.68 | 3.17 | 3.12 | 2.88 | 2.57 | - | - | - | - | 2.82 |
| .60 | - | - | 2.69 | 2.68 | 2.74 | 2.84 | 2.76 | - | - | 2.52 | - | - |
| 127.34 | 2.61 | 1.83 | 2.63 | 2.18 | 2.30 | 1.23 | 6.17 | - | - | 2.18 | - | 2.59 |
| .40 | 2.99 | 2.22 | 2.35 | 2.53 | 2.44 | 2.82 | 2.72 | - | - | 2.84 | - | 2.66 |
| .45 | 3.24 | 2.54 | 2.73 | 2.87 | 2.55 | 2.46 | 2.76 | - | - | - | - | - |
| .50 | 3.00 | 2.85 | 3.80 | 3.51 | 3.09 | 2.70 | 2.81 | - | - | 2.78 | - | 2.73 |
| .55 | 3.16 | 2.20 | 2.82 | 3.37 | 2.93 | 2.97 | 2.43 | - | - | - | - | 2.79 |
| .60 | - | - | 2.79 | 2.71 | 2.86 | 2.31 | 2.86 | - | - | 3.34 | - | - |

Table I (Cont'd)
Record of Standardized Haul Factors for Oblique Hauls
made with Plankton Nets during Cruises 5501-5512, 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 130.30 | 2.50 | 1.95 | 2.97 | 1.59 | 2.65 | 1.41 | 2.58 | - | - | 2.29 | - | 2.66 |
| .35 | 2.79 | 2.90 | 2.87 | 2.16 | 2.44 | 1.89 | 3.80 | - | - | 4.24 | - | 2.93 |
| .40 | 2.64 | 3.13 | 2.80 | 2.14 | 3.09 | 3.30 | 4.29 | - | - | 3.05 | - | 2.82 |
| .50 | 3.22 | 2.60 | 2.66 | 2.56 | 3.32 | 2.94 | 2.75 | - | - | 2.39 | - | 2.80 |
| .55 | - | - | - | 2.36 | - | - | - | - | - | - | - | - |
| .60 | 3.06 | 3.23 | 3.32 | 3.47 | 3.33 | 2.64 | 2.63 | - | - | 2.46 | - | - |
| 133.25 | 2.47 | N.Q. | 1.83 | 2.00 | 2.95 | 1.51 | 2.56 | - | - | 3.16 | - | 2.61 |
| .30 | 2.62 | 1.94 | 2.59 | 2.88 | 2.90 | 2.64 | 2.97 | - | - | 2.61 | - | 3.29 |
| .40 | 3.30 | 3.06 | 2.52 | 2.89 | N.Q. | 3.31 | 2.56 | - | - | - | - | 2.83 |
| .50 | - | - | 2.73 | 3.76 | 3.36 | 3.10 | 2.74 | - | - | - | - | - |
| .60 | - | - | 1.41 | - | - | - | - | - | - | - | - | - |
| 137.23 | 2.73 | 2.71 | 2.42 | 2.33 | 2.55 | 9.12 | 2.28 | - | - | 2.44 | - | 2.87 |
| .30 | 3.04 | 2.96 | 2.18 | 1.92 | 2.78 | 2.42 | 2.65 | - | - | 2.94 | - | 3.15 |
| .40 | 2.74 | 2.89 | 2.79 | 3.07 | 2.99 | 2.85 | 2.96 | - | - | - | - | 2.94 |
| .50 | - | - | 2.95 | 2.65 | 2.64 | 1.82 | 2.73 | - | - | - | - | - |
| .60 | - | - | 3.21 | - | - | - | - | - | - | - | - | - |
| 140.30 | 3.39 | 2.71 | 2.38 | - | - | - | - | - | - | - | - | 2.80 |
| .35 | 3.23 | 2.79 | 2.55 | - | - | - | - | - | - | - | - | 3.09 |
| .40 | 3.51 | 3.11 | 2.28 | - | - | - | - | - | - | - | - | 4.35 |
| .50 | - | - | 2.92 | - | - | - | - | - | - | - | - | - |
| 143.26 | 2.33 | 2.53 | 2.89 | - | - | - | - | - | - | - | - | 2.28 |
| .30 | 3.00 | 2.40 | 3.08 | - | - | - | - | - | - | - | - | 3.03 |
| .35 | 3.24 | 3.37 | 2.98 | - | - | - | - | - | - | - | - | 3.19 |
| .40 | - | - | 2.40 | - | - | - | - | - | - | - | - | - |
| .50 | - | - | 2.18 | - | - | - | - | - | - | - | - | - |
| 147.20 | 3.39 | 2.78 | 2.51 | - | - | - | - | - | - | - | - | 2.60 |
| .25 | 2.93 | 2.73 | 1.94 | - | - | - | - | - | - | - | - | 2.77 |
| .30 | 1.64 | 3.19 | 1.87 | - | - | - | - | - | - | - | - | 2.96 |
| .40 | - | - | 1.66 | - | - | - | - | - | - | - | - | - |
| 150.19 | 3.31 | 2.97 | 3.20 | - | - | - | - | - | - | - | - | 2.96 |
| .25 | 3.02 | 2.34 | 2.36 | - | - | - | - | - | - | - | - | 2.75 |
| .30 | 3.04 | 3.04 | 1.92 | - | - | - | - | - | - | - | - | 2.73 |
| .40 | - | - | 2.46 | - | - | - | - | - | - | - | - | - |
| 153.16 | 3.22 | 2.83 | 2.19 | - | - | - | - | - | - | - | - | - |
| .20 | 3.68 | 2.92 | 2.20 | - | - | - | - | - | - | - | - | - |
| .30 | N.Q. | 2.44 | 2.22 | - | - | - | - | - | - | - | - | - |
| .40 | - | - | 3.23 | - | - | - | - | - | - | - | - | - |
| 157.10 | 3.36 | 2.96 | 3.22 | - | - | - | - | - | - | - | - | - |
| .20 | 2.84 | 1.86 | 3.00 | - | - | - | - | - | - | - | - | - |
| .30 | 3.16 | 2.73 | 3.07 | - | - | - | - | - | - | - | - | - |
| .40 | - | - | 2.09 | - | - | - | - | - | - | - | - | - |

Table I (Supplement)
Record of Standardized Haul Factors for Oblique Hauls
made with Plankton Nets during Cruises 5501-5512, 1955

I-a: Coverage made for sardine availability studies

**I-b: Extra tows made
at regular stations**

| 5509 | | | | | 5511 | | 5504 | |
|--------------------|---------------|------------|---------------|------------|-------------|--------|---------|---------------|
| Station | Black Douglas | Paolina T. | Black Douglas | Paolina T. | Paolina (A) | T. (B) | Station | Black Douglas |
| | (A) | (A) | (B) | (B) | | | | |
| 83.40 | 1.51 | 0.83 | 2.50 | 1.14 | 0.83 | 1.03 | 103.30 | 2.45 |
| .42 | 2.42 | 2.70 | 3.00 | 3.07 | 1.52 | 1.59 | .35 | 2.37 |
| .44 | 2.58 | 3.19 | 2.42 | 2.93 | 1.83 | 2.33 | .40 | 2.02 |
| .46 | 2.70 | 1.95 | 1.36 | 2.46 | 2.04 | 2.45 | .50 | 2.58 |
| .48 | 1.49 | 2.64 | 2.68 | 3.25 | 2.24 | 1.99 | .60 | 2.64 |
| .51 ⁵ | 2.69 | 2.94 | 2.92 | 2.87 | 2.76 | 2.11 | .70 | 2.92 |
| .52 ⁵ | 2.29 | 3.18 | 3.28 | 2.24 | 2.31 | 2.13 | .80 | 2.52 |
| .55 ⁵ | 2.97 | 4.22 | 3.07 | 2.79 | 2.47 | 2.56 | 107.80 | 2.47 |
| .57 ⁵ | 2.58 | 3.17 | 3.22 | 2.51 | 2.24 | 2.49 | 110.60 | 3.56 |
| .60 | 2.67 | 4.25 | 2.44 | 2.61 | 2.63 | 2.34 | .80 | 2.40 |
| 85.39 | 3.37 | 2.97 | 2.22 | 2.62 | 2.72 | 2.35 | 113.60 | 2.82 |
| .40 ⁵ | 3.09 | 2.48 | 2.60 | 3.11 | 2.57 | 2.37 | 117.60 | 2.75 |
| .42 ⁵ | 2.38 | 2.60 | 2.38 | 3.53 | 2.37 | 1.98 | 120.35 | 1.88 |
| .45 ⁵ | 3.03 | 2.61 | 2.44 | 3.08 | 2.55 | 2.08 | .45 | 2.92 |
| .47 ⁵ | 2.24 | 2.57 | 3.25 | 2.53 | 2.39 | 2.38 | .50 | 2.77 |
| .50 ⁵ | 1.66 | 3.28 | 2.95 | 3.07 | 1.97 | 2.36 | .55 | 2.84 |
| .52 ⁵ | 2.99 | 3.39 | 3.10 | 3.50 | 2.33 | 3.26 | .60(a) | 2.79 |
| .55 ⁵ | 3.12 | 2.60 | 3.21 | 2.36 | 2.54 | 2.62 | .60(b) | 2.53 |
| .57 ⁵ | 2.57 | 3.49 | 3.11 | 3.38 | 2.87 | 2.25 | .70 | 2.63 |
| .60 | 2.50 | 2.40 | 3.09 | 3.65 | 2.30 | 2.27 | .80 | 2.66 |
| 87.35 ⁵ | 2.56 | 2.89 | 2.59 | 2.95 | 2.49 | 2.41 | 123.50 | 2.60 |
| .37 ⁵ | 2.91 | 2.67 | 2.90 | 4.13 | 2.41 | 2.36 | .60 | 2.56 |
| .40 ⁵ | 2.33 | 2.69 | 3.02 | 3.56 | 2.86 | 2.03 | 127.50 | 2.67 |
| .42 ⁵ | 2.74 | 2.61 | 2.68 | 3.00 | 2.57 | 2.38 | .60 | 2.41 |
| .45 ⁵ | 2.69 | 2.88 | 2.67 | 2.96 | 2.40 | 2.57 | 130.50 | 2.51 |
| .47 ⁵ | 2.43 | 3.29 | 2.81 | 2.95 | 2.21 | - | .60 | 2.46 |
| .50 ⁵ | 2.18 | 1.89 | 3.00 | 2.76 | 2.18 | - | | |
| .52 ⁵ | 2.49 | 2.55 | 2.39 | 2.58 | 2.14 | 2.15 | | |
| .55 ⁵ | 3.12 | - | 3.15 | 2.46 | 2.61 | 2.37 | | |
| .57 ⁵ | 2.82 | - | 3.28 | 2.25 | 2.29 | 2.61 | | |
| .60 | 2.56 | - | 2.99 | 3.28 | 2.80 | 2.34 | | |
| 90.28 | 3.56 | 3.41 | 3.16 | 2.15 | 3.18 | 2.75 | | |
| .30 ⁵ | 2.53 | 3.13 | 3.16 | 3.31 | 2.63 | 2.42 | | |
| .32 ⁵ | 2.11 | 2.98 | 2.92 | 3.46 | 2.43 | 2.72 | | |
| .35 ⁵ | 3.39 | 2.82 | 2.67 | 2.87 | 2.72 | 2.29 | | |
| .37 ⁵ | 3.06 | 2.75 | 3.12 | 2.76 | 2.07 | 2.19 | | |
| .40 ⁵ | 2.67 | 3.38 | 2.88 | 3.32 | 2.22 | 2.37 | | |
| .42 ⁵ | 2.79 | 3.17 | 3.00 | 2.90 | 2.12 | 2.72 | | |
| .45 ⁵ | 2.90 | 3.41 | 3.50 | 2.76 | 2.15 | 2.47 | | |
| .47 ⁵ | 2.95 | 1.83 | 2.51 | 3.27 | 2.71 | 2.28 | | |
| .50 ⁵ | 3.11 | 2.44 | 2.73 | 2.31 | 2.62 | 2.12 | | |
| .52 ⁵ | 2.98 | 2.46 | 2.89 | 3.25 | 2.11 | 2.20 | | |
| .55 | 2.95 | 3.34 | 2.23 | 2.89 | 2.25 | 2.00 | | |

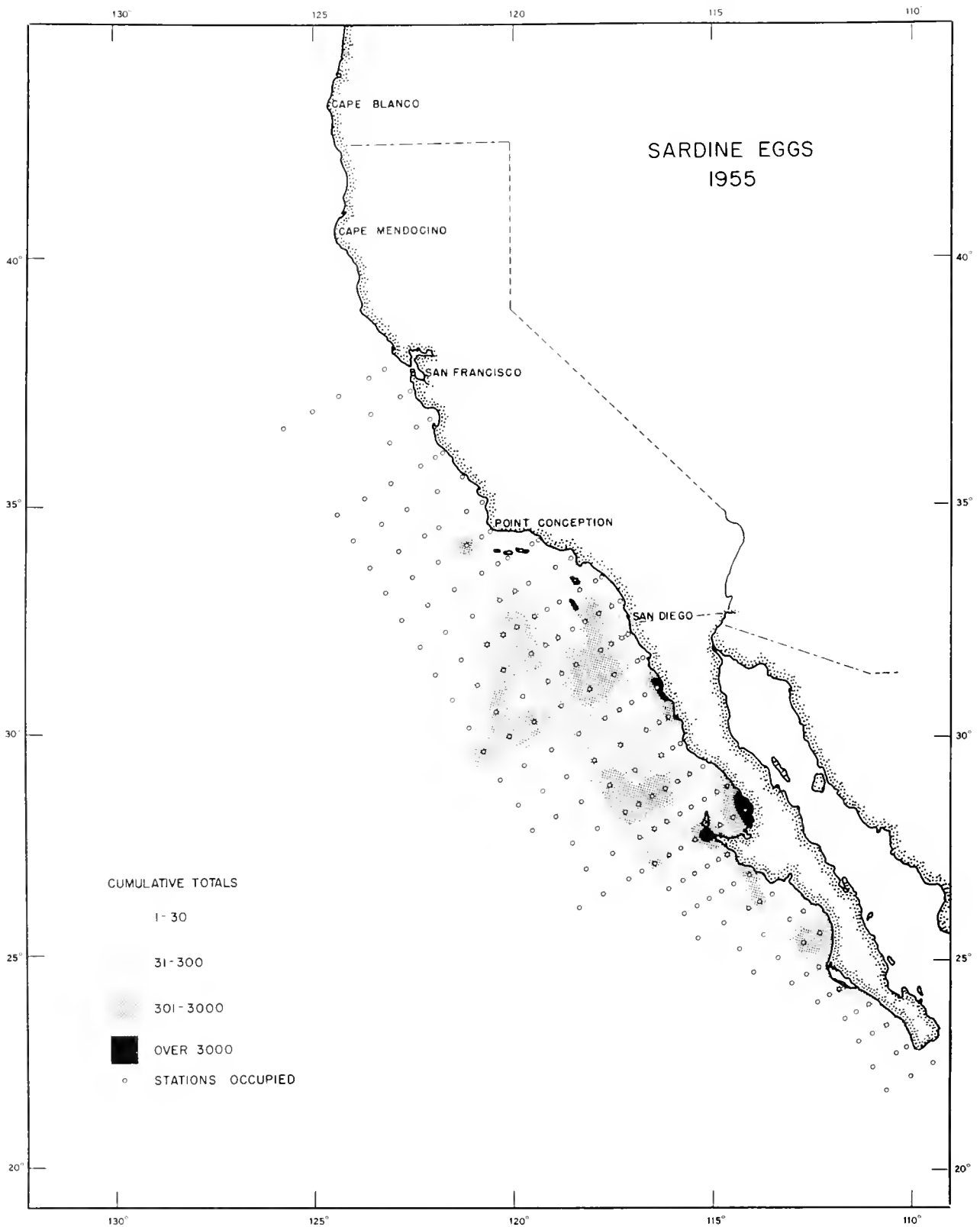


Figure 2.--Sardine eggs, 1955: distribution and relative abundance.

RECORD OF SARDINE EGGS, 1955

The distribution and relative abundance of sardine eggs in 1955 are shown in figure 2. This chart is comparable to the distributions for 1950 and 1951 in Ahlstrom (1954, figs. 7 and 8). Five categories of abundance are used: zero spawning; light spawning, 1-30 eggs; moderate spawning, 31-300 eggs; moderately heavy spawning, 301-3000 eggs; and heavy spawning, over 3000 eggs. The value plotted for each station is the cumulative standard haul total for the year.

A record of all hauls containing sardine eggs in 1955 is given in table II. The eggs are grouped under two headings: "Number of normal eggs" and "Total number of eggs". The total number includes both normally developing sardine eggs, and eggs classified as abnormal. Abnormal eggs have embryos that are stunted and misshapen; it is not known whether this is due to a diseased condition of the eggs or to mechanical injury during collection and preservation.

Age categories of eggs are designated by the letters A through D, as follows:

- A - Eggs spawned within 24 hours of collection
 - B - Eggs spawned within 24.1 to 48 hours of collection
 - C - Eggs spawned within 48.1 to 72 hours of collection
 - D - Eggs spawned within 72.1 to 96 hours of collection
- Unclassified eggs (Uncl.) includes deteriorating eggs that cannot be classified with certainty.

The occurrence and abundance of sardine eggs are summarized by month and area in text table 2. No sardine eggs were obtained off central California (station lines 60-77), consequently this area is omitted from the table.

The distribution of sardine spawning has changed quite markedly during the time period covered by the surveys (1950 to date). In 1950 and 1951, spawning was separable into two centers: a northern center off southern California and northern Baja California (lines 80-107), and a southern center off central Baja California (lines 110-137). In recent years the two centers are less well defined, and it may be misleading to continue to use these designations, except as a convenient method of subdividing the spawning area into an upper and a lower "half". In 1955, there was approximately as much spawning in the upper center as in the lower. There was also considerable spawning in the upper center in 1954. As there was practically no spawning in this center in 1952 and 1953, there must have been a marked shift in the spawning population between 1953 and 1954.

Text table 2.--Sardine eggs: occurrence and abundance (standard haul totals)
of sardine eggs, by month and area, in hauls made during 1955

| Cruise | Southern California 80-93 | | Northern Baja California 97-107 | | Upper central Baja California 110-120 | | Lower central Baja California 123-137 | | Southern Baja California 140-157 | | Total | |
|---------|---------------------------------|-------------|---------------------------------------|-------------|---|-------------|---|-------------|--|-------------|------------------|-------------|
| | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber |
| 5501 | 0 | 0 | 1 | 8 | 7 | 4,636 | 2 | 462 | 4 | 228 | 14 | 5,334 |
| 5502 | 0 | 0 | 7 | 5,550 | 10 | 3,214 | 0 | 0 | 1 | 81 | 18 | 8,845 |
| 5503 | 3 | 517 | 12 | 1,085 | 9 | 2,359 | 1 | 8 | 0 | 0 | 25 | 3,969 |
| 5504 | 5 | 55 | 24 | 4,508 | 14 | 371 | 0 | 0 | - | - | 43 | 4,934 |
| 5505 | 14 | 2,570 | 14 | 4,523 | 5 | 4,010 | 2 | 1,935 | - | - | 35 | 13,038 |
| 5506 | 15 | 2,827 | 9 | 468 | 4 | 3,176 | 1 | 5 | - | - | 29 | 6,476 |
| 5507 | 2 | 38 | 1 | 10 | 4 | 661 | 3 | 1,028 | - | - | 10 | 1,737 |
| 5508 | - | - | - | - | - | - | - | - | - | - | - | - |
| 5509 | 0 | 0 | - | - | - | - | - | - | - | - | 0 | 0 |
| 5510 | 0 | 0 | 0 | 0 | 5 | 260 | 1 | 6 | - | - | 6 | 266 |
| 5511 | 0 | 0 | 0 | 0 | - | - | - | - | - | - | 0 | 0 |
| 5512 | 0 | 0 | 1 | 4 | 2 | 76 | 3 | 519 | 0 | 0 | 6 | 599 |
| Total | 39 | 6,007 | 69 | 16,156 | 60 | 18,763 | 13 | 3,963 | 5 | 309 | 186 | 45,198 |
| Percent | 13.3 | | 35.7 | | 41.4 | | 8.8 | | 0.7 | | 99.9 | |

Table II
Record of Sardine Eggs, 1955

| Station | Number of Normal Eggs | | | | Total Number of Eggs | | | | | |
|--------------|-----------------------|------|------|-----|----------------------|------|------|-----|-------|------|
| | A | B | C | D | A | B | C | D | Uncl. | n |
| Cruise 5501: | | | | | | | | | | |
| 107.32 | - | - | 4 | - | - | - | 8 | - | - | 8 |
| 113.40 | 24 | 3 | 0 | - | 66 | 3 | 0 | - | 6 | 75 |
| .50 | 22 | 179 | 85 | - | 160 | 484 | 495 | - | 72 | 1211 |
| .60 | 39 | 257 | 33 | - | 211 | 586 | 76 | - | 0 | 873 |
| 117.50 | - | 3 | - | - | 0 | 3 | 0 | - | 0 | 3 |
| 120.35 | 0 | 0 | 6 | - | 0 | 0 | 20 | - | 0 | 20 |
| .40 | 12 | 260 | 21 | 12 | 12 | 2288 | 44 | 46 | 0 | 2390 |
| .45 | 0 | 0 | 18 | 12 | 0 | 0 | 34 | 18 | 12 | 64 |
| 123.37 | 14 | 3 | 0 | - | 25 | 6 | 0 | - | 0 | 31 |
| 137.23 | 0 | 8 | 120 | - | 0 | 19 | 393 | - | 19 | 431 |
| 147.20 | 0 | 102 | - | - | 0 | 214 | - | - | 0 | 214 |
| 150.19 | 0 | 7 | - | - | 0 | 7 | - | - | 0 | 7 |
| 153.16 | 3 | 0 | - | - | 3 | 0 | - | - | 0 | 3 |
| .20 | 0 | 0 | - | - | 0 | 4 | - | - | 0 | 4 |
| Total | 114 | 822 | 287 | 24 | 477 | 3614 | 1070 | 64 | 109 | 5334 |
| Cruise 5502: | | | | | | | | | | |
| 103.30 | 0 | 718 | 1528 | - | 0 | 1072 | 2497 | - | 0 | 3569 |
| .50 | 0 | 0 | 7 | 27 | 0 | 0 | 10 | 75 | 0 | 85 |
| .60 | 6 | 0 | 0 | - | 29 | 0 | 0 | - | 0 | 29 |
| 107.32 | 0 | 36 | 665 | 214 | 0 | 60 | 1152 | 443 | 0 | 1655 |
| .35 | 0 | 0 | 0 | - | 0 | 0 | 20 | - | 0 | 20 |
| .40 | 0 | 0 | 53 | - | 3 | 13 | 150 | - | 0 | 166 |
| .50 | 0 | 0 | 7 | 3 | 0 | 0 | 10 | 16 | 0 | 26 |
| 110.40 | 0 | 0 | 3 | - | 0 | 3 | 3 | - | 0 | 6 |
| .50 | 0 | 0 | 10 | - | 7 | 0 | 20 | - | 0 | 27 |
| .60 | 3 | 55 | 296 | - | 3 | 131 | 455 | - | 0 | 589 |
| 113.35 | 0 | 0 | 22 | 10 | 0 | 0 | 32 | 10 | 0 | 42 |
| .40 | 0 | 0 | 3 | - | 0 | 3 | 21 | - | 0 | 24 |
| .45 | 34 | 6 | 83 | - | 160 | 21 | 172 | - | 0 | 353 |
| .50 | 0 | 599 | 152 | - | 4 | 1343 | 348 | - | 0 | 1695 |
| 117.45 | 0 | 0 | 0 | - | 0 | 0 | 4 | - | 0 | 4 |
| .50 | 0 | 0 | 19 | - | 0 | 3 | 28 | - | 0 | 31 |
| 120.25 | 0 | 61 | 291 | - | 0 | 73 | 370 | - | 0 | 443 |
| 143.26 | 0 | 53 | - | - | 0 | 81 | - | - | 0 | 81 |
| Total | 43 | 1528 | 3139 | 254 | 206 | 2803 | 5292 | 544 | 0 | 8845 |

Table II (Cont'd)
Record of Sardine Eggs, 1955

| Station | Number of Normal Eggs | | | | Total Number of Eggs | | | | | |
|--------------|-----------------------|-----|-----|----|----------------------|-----|------|-----|-------|------|
| | A | B | C | D | A | B | C | D | Uncl. | n |
| Cruise 5503: | | | | | | | | | | |
| 90.70 | 0 | 23 | 76 | - | 0 | 69 | 163 | - | 0 | 232 |
| 93.30 | 6 | 0 | 6 | 0 | 35 | 0 | 15 | 0 | 0 | 50 |
| .70 | 0 | 69 | 0 | 0 | 0 | 235 | 0 | 0 | 0 | 235 |
| 97.50 | 0 | 41 | 50 | 2 | 18 | 52 | 107 | 2 | 0 | 179 |
| .60 | 5 | 8 | 26 | - | 23 | 8 | 50 | - | 0 | 81 |
| .70 | 0 | 2 | 0 | - | 0 | 4 | 0 | - | 0 | 4 |
| 100.30 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 8 |
| .50 | 81 | 0 | 0 | - | 318 | 0 | 0 | - | 0 | 318 |
| .60 | 28 | 14 | 3 | - | 49 | 14 | 3 | - | 0 | 66 |
| .70 | 3 | 3 | 142 | - | 3 | 3 | 278 | - | 0 | 284 |
| .80 | 0 | 0 | 14 | - | 0 | 0 | 21 | - | 0 | 21 |
| 103.30 | 0 | 9 | 0 | - | 0 | 22 | 0 | - | 0 | 22 |
| .70 | 0 | 0 | 0 | - | 0 | 0 | 2 | - | 0 | 2 |
| 107.50 | 0 | 0 | 0 | - | 0 | 4 | 0 | - | 0 | 4 |
| .60 | 3 | 42 | 0 | - | 6 | 90 | 0 | - | 0 | 96 |
| 110.50 | 0 | 0 | 3 | - | 0 | 0 | 3 | - | 0 | 3 |
| .60 | 0 | 3 | - | - | 0 | 10 | - | - | 0 | 10 |
| .80 | 0 | 0 | 0 | - | 0 | 0 | 3 | - | 0 | 3 |
| 113.35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 |
| .55 | 7 | 72 | 341 | - | 59 | 236 | 1394 | - | 0 | 1689 |
| 117.55 | 3 | 47 | 19 | - | 22 | 105 | 60 | - | 0 | 187 |
| .60 | 0 | 0 | 4 | - | 0 | 4 | 12 | - | 0 | 16 |
| 120.55 | 0 | 0 | 9 | - | 0 | 0 | 79 | - | 0 | 79 |
| .60 | 18 | 26 | 15 | - | 137 | 73 | 38 | - | 119 | 367 |
| 123.60 | 0 | 0 | 5 | - | 0 | 0 | 8 | - | 0 | 8 |
| Total | 154 | 359 | 713 | 2 | 670 | 929 | 2244 | 7 | 119 | 3969 |
| Cruise 5504: | | | | | | | | | | |
| 90.60 | 0 | 0 | 0 | 0 | 0 | 8 | 16 | 0 | 14 | 38 |
| .80 | 0 | 4 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 8 |
| 93.50 | 0 | 0 | 0 | - | 0 | 3 | 0 | - | 0 | 3 |
| .60 | 0 | 0 | 0 | - | 0 | 3 | 0 | - | 0 | 3 |
| .80 | 0 | 3 | 0 | - | 0 | 3 | 0 | - | 0 | 3 |
| 97.40 | 8 | 174 | 5 | - | 8 | 353 | 5 | - | 0 | 366 |
| .50 | 8 | 11 | 11 | - | 71 | 25 | 36 | - | 0 | 132 |
| .60 | 0 | 0 | 0 | - | 3 | 0 | 3 | - | 0 | 6 |
| .80 | 180 | 66 | 328 | - | 445 | 112 | 451 | - | 0 | 1008 |
| 100.50 | 3 | 16 | 76 | - | 6 | 19 | 89 | - | 0 | 114 |
| .60 | 0 | 6 | 0 | - | 0 | 9 | 0 | - | 0 | 9 |
| .70 | 11 | 40 | 0 | - | 20 | 57 | 6 | - | 0 | 83 |
| .80 | 0 | 77 | 184 | 60 | 0 | 294 | 528 | 266 | 143 | 1231 |
| .90 | 55 | 153 | 409 | - | 157 | 255 | 537 | - | 0 | 949 |

Table II (Cont'd)
Record of Sardine Eggs, 1955

| Station | Number of Normal Eggs | | | | Total Number of Eggs | | | | | |
|-----------------------|-----------------------|-----|------|----|----------------------|------|------|-----|-------|------|
| | A | B | C | D | A | B | C | D | Uncl. | n |
| Cruise 5504 (cont'd): | | | | | | | | | | |
| Bl03.30 | 15 | 0 | 0 | - | 52 | 0 | 0 | - | 0 | 52 |
| H .35 | 0 | 18 | - | - | 4 | 18 | - | - | 0 | 22 |
| H .40 | 0 | 0 | 6 | - | 0 | 0 | 6 | - | 0 | 6 |
| B .45 | 0 | 0 | 0 | - | 0 | 0 | 3 | - | 0 | 3 |
| B .50 | 0 | 0 | 0 | - | 0 | 3 | 10 | - | 18 | 31 |
| C .50 | 3 | 26 | 28 | - | 3 | 29 | 31 | - | 0 | 63 |
| B .55 | 0 | 3 | 3 | - | 0 | 3 | 6 | - | 0 | 9 |
| B .60 | 0 | 0 | 0 | - | 0 | 8 | 29 | - | 3 | 40 |
| C .60 | 6 | 22 | 22 | - | 6 | 28 | 30 | - | 0 | 64 |
| B .65 | 0 | 6 | 33 | - | 0 | 12 | 71 | - | 0 | 83 |
| C .70 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 3 | 0 | 6 |
| B .80 | 0 | 0 | 0 | - | 2 | 0 | 0 | - | 0 | 2 |
| H107.35 | 0 | 8 | 0 | - | 0 | 24 | 0 | 3 | 0 | 27 |
| H .40 | 8 | 0 | 4 | - | 8 | 0 | 8 | - | 0 | 16 |
| H .50 | 0 | 136 | 6 | - | 0 | 180 | 6 | - | 0 | 186 |
| H110.35 | 0 | 6 | 0 | - | 0 | 8 | 0 | - | 0 | 8 |
| H .40 | 0 | 0 | 22 | - | 0 | 0 | 29 | - | 0 | 29 |
| H .50 | 0 | 4 | 0 | - | 0 | 4 | 0 | - | 0 | 4 |
| H113.45 | 0 | 0 | 43 | - | 0 | 0 | 52 | - | 0 | 52 |
| H .50 | 0 | 0 | 3 | - | 0 | 0 | 3 | - | 0 | 3 |
| H .55 | 0 | 20 | 12 | - | 0 | 23 | 15 | - | 0 | 38 |
| H .60 | 3 | 30 | - | - | 8 | 63 | - | - | 3 | 74 |
| B .60 | 0 | 6 | 0 | - | 0 | 9 | 0 | - | 0 | 9 |
| H117.35 | 0 | 0 | 3 | - | 0 | 0 | 6 | - | 0 | 6 |
| H .45 | 0 | 0 | 3 | - | 0 | 0 | 3 | - | 0 | 3 |
| H .55 | 0 | 23 | 29 | - | 0 | 46 | 41 | - | 6 | 93 |
| H .60 | 0 | 12 | 15 | - | 0 | 12 | 24 | - | 3 | 39 |
| H .70 | 0 | 0 | 10 | - | 0 | 0 | 10 | - | 0 | 10 |
| Bl20.65 | 0 | 0 | 0 | - | 0 | 3 | 0 | - | 0 | 3 |
| Total | 300 | 870 | 1258 | 60 | 793 | 1622 | 2057 | 272 | 190 | 4934 |
| Cruise 5505: | | | | | | | | | | |
| 90.37 | 0 | 0 | 0 | - | 0 | 0 | 0 | - | 4 | 4 |
| .45 | 0 | 11 | 0 | 0 | 0 | 17 | 6 | 0 | 0 | 23 |
| .60 | 3 | 165 | 0 | 0 | 3 | 370 | 0 | 0 | 40 | 413 |
| .65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 17 |
| 93.35 | 0 | 3 | 0 | - | 0 | 3 | 0 | - | 3 | 6 |
| .40 | 0 | 25 | 6 | - | 3 | 76 | 82 | - | 62 | 223 |
| .45 | 0 | 0 | 0 | - | 0 | 0 | 3 | - | 0 | 3 |
| .50 | 0 | 0 | 0 | 15 | 0 | 0 | 12 | 27 | 0 | 39 |
| 93.55 | 15 | 55 | 3 | - | 30 | 70 | 12 | - | 0 | 112 |

Table II (Cont'd)
Record of Sardine Eggs, 1955

| Station | Number of Normal Eggs | | | | Total Number of Eggs | | | | | |
|-----------------------|-----------------------|------|-----|----|----------------------|------|------|----|-------|-------|
| | A | B | C | D | A | B | C | D | Uncl. | n |
| Cruise 5505 (cont'd): | | | | | | | | | | |
| 93.60 | 0 | 64 | 6 | - | 52 | 232 | 104 | - | 52 | 440 |
| .65 | 3 | 65 | 14 | - | 54 | 163 | 50 | - | 0 | 267 |
| .70 | 110 | 78 | 15 | - | 632 | 87 | 18 | - | 247 | 984 |
| .75 | 0 | 0 | 12 | 6 | 0 | 0 | 15 | 6 | 0 | 21 |
| .80 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 |
| 97.32 | 0 | 44 | 130 | - | 16 | 50 | 187 | - | 6 | 259 |
| .35 | 6 | 28 | 14 | - | 6 | 36 | 56 | - | 6 | 104 |
| .40 | 36 | 230 | 45 | - | 137 | 510 | 271 | - | 226 | 1144 |
| .45 | 410 | 0 | 20 | - | 1535 | 0 | 33 | - | 430 | 1998 |
| .50 | 0 | 40 | 30 | - | 40 | 66 | 116 | - | 17 | 239 |
| .55 | 0 | 0 | 0 | - | 0 | 0 | 3 | - | 0 | 3 |
| 100.40 | 59 | 20 | 48 | - | 186 | 40 | 136 | - | 20 | 382 |
| .45 | 55 | 0 | 18 | - | 104 | 3 | 27 | - | 9 | 143 |
| .50 | 0 | 23 | 11 | - | 87 | 53 | 49 | - | 11 | 200 |
| 103.35 | 0 | 0 | 9 | - | 3 | 15 | 9 | - | 0 | 27 |
| .40 | 0 | 3 | 0 | - | 6 | 3 | 0 | - | 0 | 9 |
| .45 | 3 | 0 | - | - | 3 | 3 | - | - | 0 | 6 |
| 107.35 | 0 | 0 | 0 | - | 0 | 0 | 0 | - | 6 | 6 |
| .45 | 0 | 0 | 3 | - | 0 | 0 | 3 | - | 0 | 3 |
| 110.35 | 0 | 0 | 3 | - | 0 | 0 | 3 | - | 0 | 3 |
| 117.26 | 0 | 0 | 12 | - | 137 | 274 | 37 | - | 25 | 473 |
| 120.25 | 344 | 1784 | 299 | - | 798 | 1972 | 299 | - | 0 | 3069 |
| .27 | 93 | 0 | 0 | - | 119 | 0 | 0 | - | 0 | 119 |
| .30 | 264 | 46 | 0 | - | 300 | 46 | 0 | - | 0 | 346 |
| 137.23 | 673 | 133 | 0 | - | 1346 | 194 | 0 | - | 0 | 1540 |
| .30 | 58 | 133 | 36 | - | 164 | 150 | 56 | - | 25 | 395 |
| Total | 2132 | 2950 | 734 | 21 | 5761 | 4433 | 1605 | 33 | 1206 | 13038 |
| Cruise 5506: | | | | | | | | | | |
| 80.60 | 220 | 232 | 557 | - | 417 | 313 | 615 | - | 0 | 1345 |
| .70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 |
| .80 | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 |
| 87.35 | 0 | 0 | 12 | - | 0 | 0 | 12 | - | 0 | 12 |
| .40 | 0 | 0 | 5 | - | 0 | 2 | 5 | - | 0 | 7 |
| .55 | 0 | 6 | 31 | - | 0 | 18 | 49 | - | 6 | 73 |
| .60 | 0 | 43 | 29 | - | 0 | 43 | 29 | - | 0 | 72 |
| 90.50 | 0 | 0 | 0 | - | 0 | 0 | 0 | - | 3 | 3 |
| .55 | 6 | 11 | 0 | - | 28 | 11 | 0 | - | 0 | 39 |
| .60 | 0 | 0 | 20 | 13 | 0 | 0 | 47 | 46 | 0 | 93 |

Table II (Cont'd)
Record of Sardine Eggs, 1955

| Station | Number of Normal Eggs | | | | Total Number of Eggs | | | | | |
|-----------------------|-----------------------|------|------|----|----------------------|------|------|----|-------|------|
| | A | B | C | D | A | B | C | D | Uncl. | n |
| Cruise 5506 (cont'd): | | | | | | | | | | |
| 90.65 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 14 | 0 | 14 |
| 93.27 | 0 | 2 | 0 | - | 0 | 2 | 0 | - | 2 | 4 |
| .35 | 12 | 65 | 53 | - | 37 | 369 | 143 | - | 0 | 549 |
| .40 | 0 | 18 | 48 | - | 0 | 72 | 161 | - | 24 | 257 |
| .70 | 0 | 0 | 287 | - | 0 | 0 | 348 | - | 0 | 348 |
| 97.30 | 25 | 58 | 0 | - | 55 | 98 | 0 | - | 15 | 168 |
| .35 | 0 | 3 | - | - | 0 | 3 | - | - | 0 | 3 |
| .40 | 0 | 0 | 17 | - | 0 | 0 | 51 | - | 0 | 51 |
| .45 | 0 | 0 | 0 | - | 0 | 0 | 3 | - | 0 | 3 |
| .50 | 0 | 4 | 0 | - | 0 | 33 | 0 | - | 8 | 41 |
| .55 | 0 | 91 | 5 | - | 0 | 136 | 5 | - | 0 | 141 |
| 100.45 | 0 | 0 | 6 | - | 0 | 6 | 12 | - | 0 | 18 |
| 103.30 | 0 | 2 | 4 | - | 2 | 4 | 24 | - | 4 | 34 |
| 107.35 | 0 | 3 | 6 | - | 0 | 3 | 6 | - | 0 | 9 |
| 117.26 | 0 | 10 | 104 | 18 | 0 | 13 | 122 | 24 | 0 | 159 |
| 120.25 | 1283 | 625 | - | - | 1544 | 836 | - | - | 0 | 2380 |
| .40 | 0 | 72 | 164 | - | 0 | 119 | 513 | - | 0 | 632 |
| .45 | 0 | 0 | 0 | - | 0 | 0 | 5 | - | 0 | 5 |
| 133.30 | 0 | 0 | 0 | - | 0 | 0 | 0 | - | 5 | 5 |
| Total | 1546 | 1250 | 1348 | 45 | 2083 | 2086 | 2150 | 84 | 73 | 6476 |
| Cruise 5507: | | | | | | | | | | |
| 87.35 | 0 | 13 | 0 | - | 0 | 16 | 0 | - | 0 | 16 |
| 90.28 | 0 | 14 | 0 | - | 0 | 22 | 0 | - | 0 | 22 |
| 103.30 | 0 | 5 | 0 | - | 5 | 5 | 0 | - | 0 | 10 |
| 117.26 | 0 | 0 | 26 | - | 0 | 4 | 35 | - | 0 | 39 |
| 120.25 | 14 | 289 | 137 | - | 30 | 341 | 214 | - | 2 | 587 |
| .30 | 0 | 5 | 24 | - | 0 | 5 | 24 | - | 0 | 29 |
| .35 | 0 | 0 | 6 | - | 0 | 0 | 6 | - | 0 | 6 |
| 123.50 | 0 | 0 | 0 | - | 0 | 3 | 0 | - | 0 | 3 |
| 130.35 | 4 | 300 | 346 | - | 8 | 437 | 449 | - | 15 | 909 |
| .40 | 0 | 13 | 103 | - | 0 | 13 | 103 | - | 0 | 116 |
| Total | 18 | 639 | 642 | - | 43 | 846 | 831 | - | 17 | 1737 |

Table II (Cont'd)
Record of Sardine Eggs, 1955

| Station | Number of Normal Eggs | | | | Total Number of Eggs | | | | | |
|--------------|-----------------------|----|----|----|----------------------|-----|----|----|-------|-----|
| | A | B | C | D | A | B | C | D | Uncl. | n |
| Cruise 5510: | | | | | | | | | | |
| 117.30 | - | - | 29 | - | 0 | 0 | 39 | - | 0 | 39 |
| 120.27 | 5 | 14 | - | - | 5 | 16 | - | - | 0 | 21 |
| .30 | 139 | 16 | - | - | 151 | 16 | - | - | 0 | 167 |
| .35 | 0 | 29 | - | - | 0 | 31 | - | - | 0 | 31 |
| .45 | 0 | 0 | 0 | - | 0 | 2 | 0 | - | 0 | 2 |
| 133.25 | 0 | 6 | 0 | - | 0 | 6 | 0 | - | 0 | 6 |
| Total | 144 | 65 | 29 | - | 156 | 71 | 39 | - | 0 | 266 |
| Cruise 5512: | | | | | | | | | | |
| 103.30 | 0 | 2 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 |
| 120.35 | 0 | 0 | 0 | - | 0 | 0 | 5 | - | 0 | 5 |
| .40 | 47 | 5 | 6 | - | 60 | 5 | 6 | - | 0 | 71 |
| 123.37 | 0 | 68 | 26 | - | 0 | 147 | 42 | - | 0 | 189 |
| .40 | 0 | 0 | 0 | 10 | 0 | 4 | 0 | 17 | 0 | 21 |
| 127.34 | 119 | 16 | - | - | 277 | 32 | - | - | 0 | 309 |
| Total | 166 | 91 | 32 | 10 | 337 | 192 | 53 | 17 | 0 | 599 |

RECORD OF SARDINE LARVAE, 1955

The distribution and relative abundance of sardine larvae in 1955 are shown in figure 3 (cf. Ahlstrom 1954, figs. 7 and 8). Five categories of abundance are used: 0 - no larvae taken; light concentration, 1-6 larvae; moderate concentration, 7-60 larvae; moderately heavy concentration, 61-600 larvae; heavy concentration, over 600 larvae. The value for each station is the cumulative standard haul total for the year.

Sardine larvae are recorded by size classes in table III. The size classes have the following midpoints and ranges:

| Midpoint (in mm.) | Range (in mm.) | Midpoint (in mm.) | Range (in mm.) |
|----------------------|-------------------|----------------------|-------------------|
| 3.00 | 2.00-4.25 | 12.75 | 12.26-13.25 |
| 4.75 | 4.26-5.25 | 13.75 | 13.26-14.25 |
| 5.75 | 5.26-6.25 | 14.75 | 14.26-15.25 |
| 6.75 | 6.26-7.25 | 15.75 | 15.26-16.25 |
| 7.75 | 7.26-8.25 | 17.25 | 16.26-18.25 |
| 8.75 | 8.26-9.25 | 19.25 | 18.26-20.25 |
| 9.75 | 9.26-10.25 | 21.25 | 20.26-22.25 |
| 10.75 | 10.25-11.25 | 23.25 | 22.26-24.25 |
| 11.75 | 11.26-12.25 | 25.25 | 24.26-26.25 |

Dis. - Disintegrating larvae that cannot be measured accurately.

The distribution of sardine larvae is somewhat different than the distribution of eggs, as is shown by the following tabulation:

| Station lines | Sardine eggs | | | Sardine larvae | | |
|------------------|------------------|--------|---------|------------------|--------|---------|
| | Occur- rences | Number | Percent | Occur- rences | Number | Percent |
| 60-77 | 0 | 0 | 0 | 0 | 0 | 0 |
| 80-93 | 39 | 6,007 | 13.3 | 26 | 1,717 | 12.1 |
| 97-107 | 69 | 16,156 | 35.7 | 72 | 3,161 | 22.4 |
| 110-120 | 60 | 18,763 | 41.4 | 93 | 6,514 | 46.1 |
| 123-137 | 13 | 3,963 | 8.8 | 46 | 1,145 | 8.1 |
| 140-157 | 5 | 309 | 0.7 | 17 | 1,584 | 11.2 |
| Total | 186 | 45,198 | 99.9 | 254 | 14,121 | 99.9 |

There are fewer larvae taken in the northern center than eggs - 34.5% of the total, as compared to 49.0%. Larvae, on the average, are about two weeks older than the eggs, and during this period they have been carried along by the predominantly southward moving currents; as a result, larvae are usually collected to the south of the area where they are spawned.

There are more occurrences of sardine larvae than of eggs: larvae were taken in 254 collections (text table 3), as compared to 186 for eggs. This is an expected finding, since it has been repeated season after season. Of course, a collection of larvae can represent up to 45 days' accumulation (the time required for larval development) while the egg stage (embryonic period) averages less than three days.

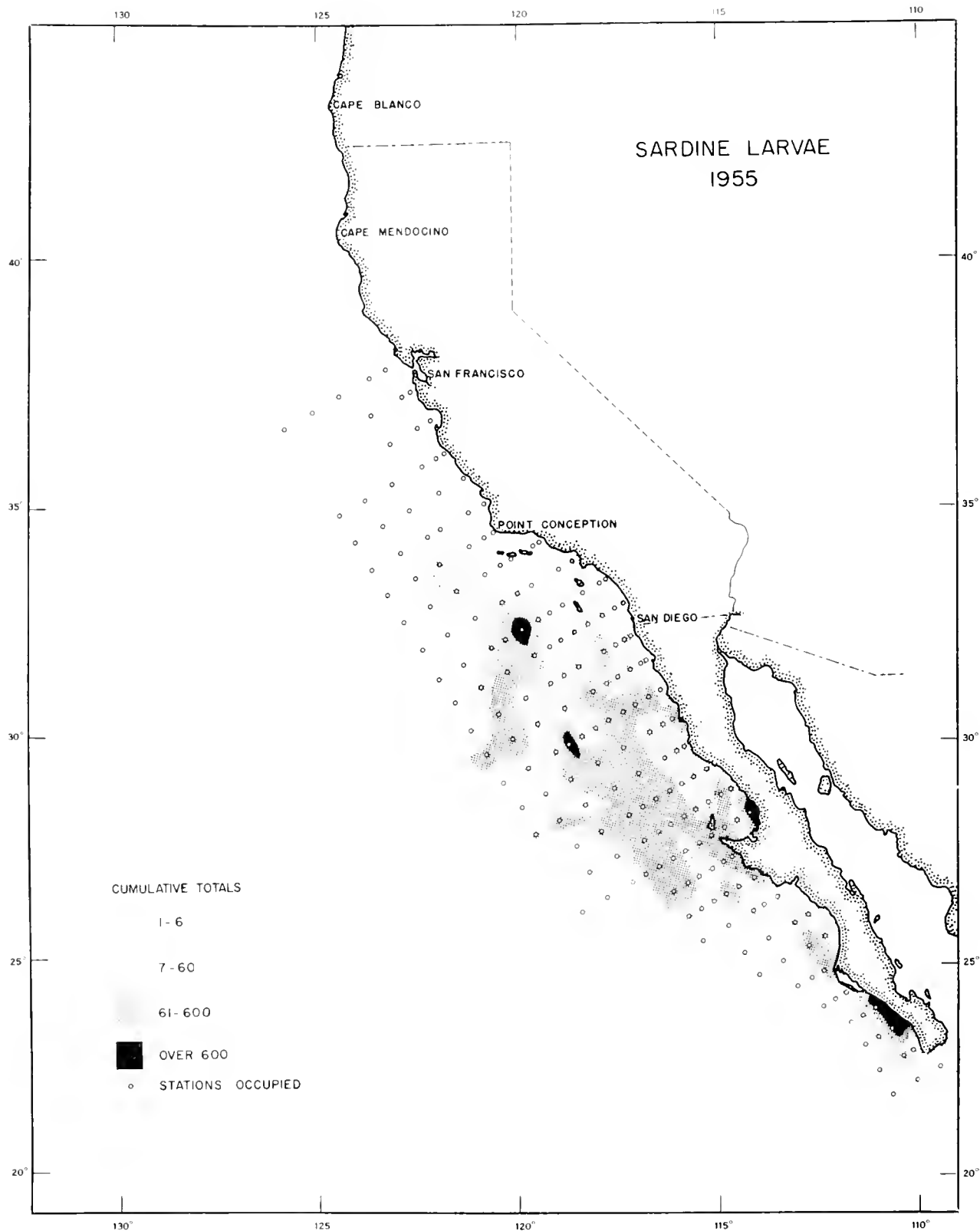


Figure 3.--Sardine larvae, 1955: distribution and relative abundance

Text table 3.--Occurrence and abundance (standard haul totals)
of sardine larvae, by month and area, in hauls made during 1955

| Cruise | Southern California 80-93 | | Northern Baja California 97-107 | | Upper central Baja California 110-120 | | Lower central Baja California 123-137 | | Southern Baja California 140-157 | | Total | |
|---------|---------------------------|-------|---------------------------------|-------|---------------------------------------|-------|---------------------------------------|-------|----------------------------------|-------|--------|--------|
| | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- |
| | rences | ber | rences | ber | rences | ber | rences | ber | rences | ber | rences | ber |
| 5501 | 0 | 0 | 0 | 0 | 14 | 830 | 8 | 272 | 8 | 1,227 | 30 | 2,329 |
| 5502 | 0 | 0 | 6 | 175 | 15 | 2,295 | 9 | 326 | 7 | 336 | 37 | 3,132 |
| 5503 | 2 | 9 | 11 | 351 | 11 | 887 | 5 | 325 | 1 | 4 | 30 | 1,576 |
| 5504 | 3 | 16 | 28 | 2,030 | 26 | 622 | 4 | 17 | - | - | 61 | 2,685 |
| 5505 | 4 | 27 | 20 | 401 | 6 | 146 | 2 | 8 | - | - | 32 | 582 |
| 5506 | 10 | 1,444 | 6 | 198 | 3 | 604 | 2 | 29 | - | - | 21 | 2,275 |
| 5507 | 7 | 221 | 1 | 6 | 6 | 891 | 7 | 60 | - | - | 21 | 1,178 |
| 5508 | - | - | - | - | - | - | - | - | - | - | - | - |
| 5509 | 0 | 0 | - | - | - | - | - | - | - | - | 0 | 0 |
| 5510 | 0 | 0 | 0 | 0 | 6 | 93 | 5 | 36 | - | - | 11 | 129 |
| 5511 | 0 | 0 | - | - | - | - | - | - | - | - | 0 | 0 |
| 5512 | 0 | 0 | 0 | 0 | 6 | 146 | 4 | 72 | 1 | 17 | 11 | 235 |
| Total | 26 | 1,717 | 72 | 3,161 | 93 | 6,514 | 46 | 1,145 | 17 | 1,584 | 254 | 14,121 |
| Percent | 12.2 | | 22.4 | | 46.1 | | 8.1 | | 11.2 | | 100.0 | |

Table III
Record of Sardine Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 3.00 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | 25.25 | Dis. | Total |
|--------------|--------|-------|-------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5501: | | | | | | | | | | | | | | | | | | | | |
| 110.33 | 10.7 | | | | | | | | | | | | | | | | | | | 10.7 |
| .35 | | 4.3 | | | | | | | | | | | | | | | | | | 4.3 |
| 113.35 | 23.2 | | | | | | | | | | | | | | | | | | | 23.2 |
| .40 | 2.7 | | | | | | | | | | | | | | | | | | | 2.7 |
| .50 | 143.0 | | | | | | | | | | | | | | | | | | | 151.2 |
| .60 | 39.2 | 102.6 | 3.0 | | | | | | | | | | | | | | | | | 144.8 |
| 117.26 | | | | | | | | | | | | | | | | | | | | 6.4 |
| .35 | | | | | | | | | | | | | | | | | | | | 3.2 |
| .50 | | 3.2 | | | | | | | | | | | | | | | | | | 3.2 |
| .60 | | | | | | | | | | | | | | | | | | | | 3.7 |
| 120.25 | 3.7 | | | | | | | | | | | | | | | | | | | 3.7 |
| .35 | 260.0 | 70.1 | | | | | | | | | | | | | | | | | | 335.9 |
| .40 | 60.3 | 11.6 | | | | | | | | | | | | | | | | | | 74.2 |
| .45 | 12.3 | 6.2 | | | | | | | | | | | | | | | | | | 58.8 |
| 123.37 | | 5.6 | 8.4 | | | | | | | | | | | | | | | | | 33.6 |
| .40 | | 21.9 | 6.3 | | | | | | | | | | | | | | | | | 56.3 |
| .45 | 3.2 | | 3.2 | | | | | | | | | | | | | | | | | 16.0 |
| 127.34 | | 2.6 | 2.6 | | | | | | | | | | | | | | | | | 98.8 |
| .40 | | | | | | | | | | | | | | | | | | | | 6.0 |
| 133.25 | | | | | | | | | | | | | | | | | | | | 12.4 |
| 137.23 | 2.7 | | | | | | | | | | | | | | | | | | | 24.5 |
| .30 | | | | | | | | | | | | | | | | | | | | 24.3 |
| 140.30 | 57.7 | 3.4 | | | | | | | | | | | | | | | | | | 64.5 |
| 143.26 | | | | | | | | | | | | | | | | | | | | 6.9 |
| .30 | | | | | | | | | | | | | | | | | | | | 6.0 |
| 147.20 | 603.5 | 64.4 | | | | | | | | | | | | | | | | | | 3.2 |
| 150.19 | 62.9 | 76.1 | 139.1 | 79.4 | 33.1 | 10.2 | 6.6 | 3.4 | | | | | | | | | | | | 684.9 |
| 153.20 | | | 11.1 | | | | | | | | | | | | | | | | | 433.5 |
| 157.10 | | | | 6.8 | 10.1 | | | | | | | | | | | | | | | 11.1 |
| | | | | | | | | | | | | | | | | | | | | 16.9 |
| Total | 1285.1 | 372.0 | 173.7 | 124.6 | 84.2 | 63.3 | 60.3 | 34.1 | 28.1 | 26.8 | 31.5 | 37.6 | 2.6 | 5.4 | | | | | | 2329.3 |

Table III (Cont'd)
Record of Sardine Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 3.00 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | 25.25 | Dis. | Total |
|--------------|-------|-------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5502: | | | | | | | | | | | | | | | | | | | | |
| 103.40 | | 17.3 | | | | | | | | | | | | | | | | | | 17.3 |
| .50 | 27.5 | | | | | | | | | | | | | | | | | | | 27.5 |
| 107.32 | 53.5 | 17.8 | 3.0 | | | | | | | | | | | | | | | | | 74.3 |
| .35 | 19.8 | | | | | | | | | | | | | | | | | | | 19.8 |
| .40 | 26.7 | 3.3 | | | | | | | | | | | | | | | | | | 30.0 |
| .60 | | 6.0 | | | | | | | | | | | | | | | | | | 6.0 |
| 110.40 | 6.5 | 13.0 | 3.2 | | | | | | | | | | | | | | | | | 22.7 |
| .50 | 62.3 | 39.4 | | | | | | | | | | | | | | | | | | 101.7 |
| .60 | 27.3 | 149.5 | 115.9 | 18.2 | | | | | | | | | | | | | | | | 310.9 |
| .70 | 11.2 | 2.8 | | | | | | | | | | | | | | | | | | 14.0 |
| 113.35 | 3.2 | 3.2 | | | | | | | | | | | | | | | | | | 6.4 |
| .40 | 5.9 | 14.8 | | | | | | | | | | | | | | | | | | 20.7 |
| .45 | 24.4 | 97.9 | 85.7 | 21.5 | | | 3.1 | | | | | | | | | | | | | 235.7 |
| .50 | 44.4 | 55.5 | 92.5 | 7.4 | | | | | | | | | | | | | | | | 199.8 |
| .70 | | | | | | | | | | | | | | | | | | | | 208.1 |
| 117.40 | | | | | | | 9.2 | 21.4 | 36.7 | 42.8 | 33.7 | 33.6 | 24.5 | 3.1 | 3.1 | | | | | 72.0 |
| .45 | | 6.9 | 3.5 | 3.5 | 13.8 | | 4.0 | | 4.0 | | | | | 4.0 | 4.0 | | | | | 6.8 |
| .50 | | 40.8 | 9.4 | 3.1 | 9.4 | | 6.9 | | 3.5 | 7.0 | 6.9 | | | 3.5 | 10.4 | 3.5 | | | | 814.7 |
| .55 | | | 3.4 | | 3.4 | | 6.2 | | | | | 3.1 | | | | | | | | 181.4 |
| 120.25 | 433.6 | 273.5 | 93.1 | 5.8 | 5.8 | | | 2.9 | | | | | | | | | | | | 2.3 |
| .40 | 37.3 | 32.1 | 74.7 | 32.0 | | | 5.3 | | | | | | | | | | | | | 6.4 |
| 123.40 | | | | | | | | | | | | | 2.3 | | | | | | | 41.9 |
| .45 | | 3.2 | | | | | 3.2 | | | | | | 2.2 | 2.2 | | | | | | 249.0 |
| 127.40 | | | | | | | 2.2 | 11.1 | 6.6 | 6.6 | 6.6 | 2.2 | 2.2 | 2.2 | 15.3 | 5.1 | | | | 2.8 |
| .45 | | | | 5.1 | 10.2 | | 10.2 | 35.5 | 35.5 | 50.8 | 25.4 | 20.3 | 10.2 | 2.8 | | | | | | 4.4 |
| .50 | | | | | | | | | | | | 2.2 | 2.2 | | | | | | | 1.9 |
| .55 | | | | | | | | | | | | | | | | | | | | 5.4 |
| 133.30 | | | | | | | | 2.7 | | | | | | | | | | 2.7 | | 11.8 |
| 137.23 | | | | | | | | | | | | | | | | | | | | 10.1 |
| .30 | | | | | | | | | | | | | | | | | | | | 278.3 |
| 143.26 | 10.1 | | | | | | | | | | | | | | | | | | | 24.5 |
| 147.20 | 63.9 | 64.0 | 11.2 | 55.6 | 50.0 | | 2.8 | 8.4 | 2.7 | 2.8 | 5.6 | 8.4 | 2.8 | 2.8 | | | | | | 3.0 |
| .25 | 2.7 | 2.7 | 5.5 | | 2.7 | | | | | | | | | | | | | | | 11.5 |
| 150.19 | | | | | | | | | | | | | | | | | | | | 6.0 |
| .25 | | | | 2.3 | 2.3 | | 2.3 | | 2.3 | 2.3 | | | | 3.0 | 3.0 | | | | | 2.4 |
| .30 | | | | | | | | | | | | | | | | | | | | |
| 153.30 | | | | | | | | | | | | | | | | | | | | |
| Total | 860.3 | 843.7 | 501.1 | 154.5 | 102.0 | 60.8 | 76.8 | 100.1 | 102.9 | 83.1 | 71.4 | 71.9 | 46.9 | 37.1 | 12.6 | 3.5 | | 2.7 | | 3131.4 |

Table III (Cont'd)
Record of Sardine Larvae, 1955

Midpoint of Size Class (in mm.)

| Station | 3.00 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | 25.25 | Dis. | Total |
|--------------|-------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5503: | | | | | | | | | | | | | | | | | | | | |
| 90.70 | 5.8 | | | | | | | | | | | | | | | | | | | 5.8 |
| 93.70 | | | | | | | | 3.4 | | | | | | | | | | | | 3.4 |
| 97.30 | 1.6 | | | | | | | | | | | | | | | | | | | 1.6 |
| .40 | | 2.2 | | | | | | | | | | | | | | | | | | 2.2 |
| .50 | 2.3 | 2.3 | 2.3 | | | | | | | | | | | | | | | | | 6.9 |
| .60 | 2.6 | | 2.6 | | | | | | | | | | | | | | | | | 5.2 |
| .70 | | | | | 2.4 | | | | | | | | | | | | | | | 2.4 |
| 100.60 | | | 3.4 | | 3.4 | | | | | | | | | | | | | | | 6.8 |
| .70 | 5.8 | | | | | | | | | | | | | | | | | | | 5.8 |
| 103.50 | | | 3.4 | | | | | | | | | | | | | | | | | 13.5 |
| 107.50 | 3.5 | 45.2 | 10.4 | | | 6.7 | 3.4 | | | | | | | | | | | | | 59.1 |
| .60 | | 3.2 | 3.2 | | | | | | | | | | | | | | | | | 6.4 |
| .70 | 8.0 | 151.0 | 79.4 | 2.6 | | | | | | | | | | | | | | | | 241.0 |
| 110.50 | | 22.4 | 33.6 | 11.2 | 2.8 | | | | | | | | | | | | | | | 70.0 |
| .60 | 10.2 | 64.3 | 20.3 | 3.4 | | | | | | | | | | | | | | | | 98.3 |
| .70 | 3.3 | | | | 3.3 | | 3.3 | | | | | | | | | | | | | 9.9 |
| .80 | 8.8 | 41.3 | 5.9 | | 3.0 | 3.0 | | | | | | | | | | | | | | 62.0 |
| .90 | | 24.2 | 3.5 | 3.5 | 3.5 | | | | | | | | | | | | | | | 34.7 |
| 113.55 | 114.8 | | 3.3 | | | 3.1 | | | | | | | | | | | | | | 118.1 |
| 117.50 | | 6.2 | 3.1 | 3.1 | | | | | | | | | | | | | | | | 15.5 |
| .55 | 27.6 | 82.8 | 11.1 | | | | | | | | | | | | | | | | | 121.5 |
| .60 | 107.5 | 38.4 | 3.8 | | | | | | | | | | | | | | | | | 149.7 |
| 120.55 | 124.2 | 33.3 | | | 3.0 | 3.0 | 3.0 | | | | | | | | | | | | | 166.5 |
| .60 | | 17.5 | 5.8 | 11.6 | 5.8 | | | | | | | | | | | | | | | 40.7 |
| 123.40 | | | | | | | | 3.4 | | | | | | | | | | | | 3.4 |
| .50 | | | | | | | | | 1.8 | | | | | 1.8 | | | | | | 3.6 |
| .55 | | 21.5 | 42.9 | 5.4 | 18.7 | 8.0 | 5.4 | | | | | | | | | | | | | 101.9 |
| .60 | | 78.0 | 94.2 | 10.8 | 21.5 | | | | | | | | | | | | | | | 204.5 |
| 127.60 | | | | 5.6 | 2.8 | | | | | | | | | | 2.8 | | | | | 11.2 |
| 153.16 | | 2.2 | 2.2 | | | | | | | | | | | | | | | | | 4.4 |
| Total | 426.0 | 636.0 | 334.4 | 57.2 | 66.8 | 27.2 | 15.1 | 6.8 | 1.8 | | | | | 1.8 | 2.8 | | | | | 1575.9 |

Table III (Cont'd)
Record of Sardine Larvae, 1955
Midpoint of Size Class (In mm.)

| Station | 3.00 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | 25.25 | Dis. | Total |
|--------------|------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| Cruise 5504: | | | | | | | | | | | | | | | | | | | | |
| 87.35 | 2.8 | | | | | | | | | | | | | | | | | | | 2.8 |
| 90.60 | 8.1 | | | | | | | | | | | | | | | | | | | 8.1 |
| 93.60 | | | 2.8 | | | | | | | | | | | | | | | | | 5.6 |
| 97.40 | 7.5 | 17.7 | | | | | | | | | | | | | | | | | | 35.2 |
| .50 | 2.7 | 2.7 | 2.7 | | | | | | | | | | | | | | | | | 8.1 |
| .60 | | 6.0 | 3.0 | 3.0 | | | | | | | | | | | | | | | | 15.0 |
| .70 | | | 6.4 | | | | | | | | | | | | | | | | | 6.4 |
| .80 | 82.6 | 39.9 | 20.0 | 2.8 | | | | | | | | | | | | | | | | 148.1 |
| 100.50 | 6.4 | 28.4 | 3.2 | 3.2 | | | | | | | | | | | | | | | | 53.9 |
| .60 | 5.8 | | 8.7 | | | | | | | | | | | | | | | | | 17.4 |
| .70 | 8.6 | | | | | | | | | | | | | | | | | | | 31.7 |
| .80 | 52.3 | 27.5 | 24.7 | 2.8 | | | | | | | | | | | | | | | | 107.3 |
| .90 | 21.9 | 36.6 | 3.6 | | | | | | | | | | | | | | | | | 62.1 |
| B103.35 | 2.4 | 56.8 | 14.2 | 2.4 | 2.4 | | | | | | | | | | | | | | | 118.4 |
| H .35 | | 11.1 | 7.4 | 3.7 | | | | | | | | | | | | | | | | 25.9 |
| B .40 | | 2.0 | 4.0 | | | | | | | | | | | | | | | | | 36.2 |
| H .40 | | 11.7 | 2.9 | 2.9 | | | | | | | | | | | | | | | | 70.2 |
| B .45 | 7.8 | 23.4 | 13.0 | 18.2 | 15.6 | 2.6 | | | | | | | | | | | | | | 93.6 |
| B .50 | 2.6 | 20.6 | 12.9 | 10.3 | | | | | | | | | | | | | | | | 49.0 |
| C .50 | | 2.8 | | | | | | | | | | | | | | | | | | 2.8 |
| B .55 | 6.0 | 9.0 | 3.0 | | | | | | | | | | | | | | | | | 21.0 |
| B .60 | 2.6 | 7.9 | | | | | | | | | | | | | | | | | | 20.9 |
| C .60 | | 27.9 | 19.5 | 5.6 | | | | | | | | | | | | | | | | 64.2 |
| B .65 | 71.5 | 302.5 | 231.0 | 71.5 | 44.0 | 16.5 | 5.6 | | | | | | | | | | | | | 737.0 |
| B .70 | | | 2.9 | 2.9 | 2.9 | | 2.9 | 2.9 | | | | | | | | | | | | 14.5 |
| C .70 | | | 2.6 | 2.6 | 2.5 | 2.6 | 10.2 | | 2.6 | | | | | | | | | | | 20.6 |
| B .80 | | 5.0 | 5.0 | 5.0 | 2.5 | 2.5 | | | | | | | | | | | | | | 20.0 |
| H107.40 | 4.2 | 12.7 | 4.2 | 4.2 | | | | | | | | | | | | | | | | 25.3 |
| H .50 | | 3.2 | 38.0 | 15.9 | 44.3 | 9.5 | 15.8 | 3.2 | 9.5 | 9.5 | 3.2 | | | | | | | | | 152.1 |
| H .60 | | 14.4 | 14.4 | 19.2 | 7.2 | | 4.8 | | | | | | | | | | | | | 64.8 |
| H .70 | | | | | | | 2.9 | 2.9 | 2.9 | 2.4 | 2.9 | | 2.4 | | | | | | | 8.7 |

Table III (Cont'd)
Record of Sardine Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 3.00 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | 25.25 | Dis. | Total |
|-----------------------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5504 (cont'd): | | | | | | | | | | | | | | | | | | | | |
| H110.35 | | | | 7.4 | | 2.0 | 7.4 | 2.0 | | | | | | | | | | | | 4.0 |
| H .40 | | | | | | | 3.5 | | | | 3.5 | | 3.7 | | | | | | | 18.5 |
| H .50 | | | | | | | 5.0 | | | | | 2.5 | | | | | | | | 7.0 |
| H .60 | | | 5.0 | 10.0 | 12.5 | 10.0 | | | | | | | | 2.5 | 2.5 | | | | | 50.0 |
| H .70 | | | 2.6 | | | | | | | | | | | | | | | | | 2.6 |
| H .80 | | | | | | | | | | 2.3 | | | | | | | | | | 2.3 |
| H .90 | | | | | | 3.1 | 3.1 | | | | | | | | | | | | | 6.2 |
| H113.45 | | | | 3.0 | | | 3.0 | 3.0 | 3.0 | | | | | | | | | | | 15.0 |
| H .50 | | 6.4 | 6.4 | 9.6 | | 3.2 | 3.0 | 3.2 | 3.2 | 6.4 | 3.2 | | | | | | | | | 41.6 |
| H .55 | | 2.9 | | 5.8 | | | | | | | | | | | | | | | | 11.6 |
| H .60 | | 27.2 | 13.6 | 8.1 | 2.9 | | | | | | | | | | | | | | | 48.9 |
| B .60 | 2.8 | 2.8 | 8.4 | | | | 2.8 | | | | | | | | | | | | | 19.6 |
| H .70 | 3.6 | 18.2 | 10.9 | | 3.6 | | | | | | | | | 2.8 | | | | | | 39.9 |
| H117.40 | 2.6 | 5.3 | | | 3.1 | | | | | | | | | | | | | | | 10.5 |
| H .45 | 3.1 | 3.1 | 6.1 | | | | | | | | 2.6 | 9.2 | | | | | | | | 24.6 |
| H .50 | 3.6 | | | | | | | | | | | | | | | | | | | 3.6 |
| H .50 | 5.8 | | 2.9 | | | | | | 7.0 | | | | | | | | | | | 8.7 |
| H .70 | 3.5 | | 3.5 | | | | | | | | | | | | | | | | | 14.0 |
| B120.45 | | | | 23.4 | | | | | | | | | | | | | | | | 23.4 |
| H .50 | | | | | | | | 7.6 | | | | | | | | | | | | 7.6 |
| B .50 | | | | | | | | | 5.5 | | | | | | | | | | | 5.5 |
| H .55 | | | | | | | | | | | | | | | | | | | | 6.9 |
| H .60 | | 5.7 | 2.8 | | 2.3 | | 2.3 | | | | | 2.3 | | | | | | | | 17.0 |
| B(1).60 | 2.8 | 2.8 | 19.6 | 5.6 | 5.7 | | 2.8 | | | | | | | | | | | | | 36.4 |
| B(2).60 | | | 25.3 | 5.1 | | 2.8 | | | | 2.8 | | | | | | | | | | 35.5 |
| B .65 | 5.6 | 34.0 | 51.0 | 39.6 | 25.5 | 2.8 | | | | | | | | | | | | | | 161.3 |
| H123.55 | | | | | | | | 3.2 | | | | | | | | | | | | 6.4 |
| H .60 | | | | 2.7 | | | | | | | | | | | | | | | | 2.7 |
| B127.50 | | | | | | | | | | | | | | | | | | | | 5.3 |
| B .60 | | | | | | | | | | | | | 2.4 | 5.3 | | | | | | 2.4 |
| Total | 329.2 | 778.2 | 611.2 | 301.5 | 200.3 | 88.6 | 111.7 | 46.6 | 64.7 | 53.8 | 43.5 | 20.6 | 11.4 | 19.5 | 5.1 | | | | | 2685.9 |

Table III (Cont'd)
Record of Sardine Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 3.00 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | 25.25 | Dis. | Total |
|--------------|-------|-------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| Cruise 5505: | | | | | | | | | | | | | | | | | | | | |
| 87.55 | | | | 2.6 | | | 2.6 | | | | | | | | | | | | | 5.2 |
| 90.70 | | | 3.0 | | | | | | | | | | | | | | | | | 3.0 |
| 93.45 | 3.1 | 9.4 | 3.1 | | | | | | | | | | | | | | | | | 15.6 |
| .50 | | | 3.1 | | | | | | | | | | | | | | | | | 3.1 |
| 97.30 | | | | | | | | | 2.6 | | | | | | | | | | | 2.6 |
| .32 | 12.7 | 9.5 | 6.3 | 6.3 | | 3.2 | | | 6.3 | | | | | | | | | | | 44.3 |
| .35 | 11.2 | 14.0 | | | | | | | | | | | | | | | | | | 33.6 |
| .40 | 29.8 | 6.0 | | | | | 5.6 | 2.8 | | | | | | | | | | | | 35.8 |
| .50 | | 23.1 | 16.5 | 3.3 | | | | | | | | | | | | | | | | 42.9 |
| .55 | 3.2 | | | | | | | | | | | | | | | | | | | 3.2 |
| .70 | | | | 3.5 | 3.5 | 13.9 | | 10.5 | 3.5 | 3.5 | 7.0 | | | | | | | | | 45.4 |
| .80 | | 4.2 | | 4.2 | | | | 4.2 | | | | | | | | | | | | 12.6 |
| 100.30 | | | | | | | | | | | | | 3.2 | | | 3.2 | | | | 6.4 |
| .35 | 40.3 | 3.1 | | | | | | | | | | | | | | | | | | 43.4 |
| .40 | 5.7 | 5.6 | 2.8 | | | | | | | | | | | | | | | | | 16.9 |
| .45 | | 3.1 | | | | | | | | | | | | | | | | | | 6.2 |
| .50 | | 3.8 | | 11.4 | | 3.8 | 15.2 | 3.1 | | 7.6 | | | | | | | | | | 45.6 |
| 103.45 | 2.9 | | | | | | | | | | | | | | | | | | | 2.9 |
| .50 | | 3.2 | | | | 3.2 | | 3.2 | 9.7 | | | | | | | | | | | 22.5 |
| .55 | | | | | | | | | | | | | | | | | | | | 9.7 |
| 107.35 | | | | | | | | | | | | | | | | | | | | 6.2 |
| .40 | | | | | | | | | | | | | 6.2 | | | | | | | 2.5 |
| .45 | | 3.1 | | | | | | | | | | | 2.5 | | | | | | | 3.1 |
| .50 | | | | | | | | | | | | | | | | | | | | 15.5 |
| 110.45 | | 2.9 | | | | | | | | | | | | | | | | | | 2.9 |
| 113.35 | | | | | | | | | | | | | | | | | | | | 6.6 |
| 117.45 | | | | | | | | | | | | | | | | | | | | 7.3 |
| .50 | | | | | | | | | 2.4 | | | | | 3.3 | 3.3 | | | | | 4.5 |
| .80 | | | | | | | | | | 4.5 | | | | 4.9 | | | | | | 2.6 |
| 120.25 | | | | | | | | | | 2.6 | | | | | | | | | | 122.0 |
| 123.40 | 11.1 | 44.3 | 33.3 | 22.2 | 11.1 | | | | | | | 4.9 | | | | | | | | 4.9 |
| 137.30 | 2.8 | | | | | | | | | | | | | | | | | | | 2.8 |
| Total | 122.8 | 135.3 | 68.1 | 56.3 | 14.6 | 24.1 | 29.6 | 30.7 | 27.6 | 21.4 | 10.2 | 11.4 | 11.9 | 8.2 | 3.3 | 6.3 | | | | 581.8 |

Table III (Cont'd)
Record of Sardine Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 3.00 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | 25.25 | Dis. | Total |
|--------------|-------|--------|-------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5506: | | | | | | | | | | | | | | | | | | | | |
| 87.35 | 11.7 | 5.9 | | | | | | | | | | | | | | | | | | 17.6 |
| .60 | 28.8 | | | | | | | | | | | | | | | | | | | 28.8 |
| 90.55 | 22.4 | 168.6 | 5.6 | | | | | | | | | | | | | | | | | 196.6 |
| .60 | 66.3 | 345.3 | 265.6 | 26.6 | 6.6 | | | | | | | | | | | | | | | 710.4 |
| .65 | 13.8 | 152.3 | 96.8 | 27.7 | | | | | | | | | | | | | | | | 290.6 |
| 93.35 | 6.2 | | | | | | 3.1 | | | | | | | | | | | | | 12.4 |
| .40 | 5.9 | 11.9 | | | | | 5.9 | | | | | | | | | | | | | 23.7 |
| .55 | | | | | | | | | | | | 5.0 | | | | | | | | 5.0 |
| .70 | | 10.2 | 30.7 | 51.2 | 51.2 | 10.2 | | | | | | | | | | | | | | 153.5 |
| .75 | | | 5.5 | | | | | | | | | | | | | | | | | 5.5 |
| 97.35 | | | | | | | | | | | | | | | | | | | | 2.6 |
| .40 | | 72.6 | 27.9 | | | | | | | | | | | | | | | | | 106.1 |
| .55 | | | | 15.1 | 5.0 | | 5.6 | | | | | | | | | | | | | 35.1 |
| 100.45 | 5.9 | | | | | | 5.0 | | | | | | | | | | | | | 17.7 |
| .50 | | 4.5 | | 4.5 | 4.5 | 4.5 | 5.9 | | | | | | | | | | | | | 31.4 |
| 103.30 | 1.8 | 1.8 | | 1.8 | | | | | | | | | | | | | | | | 5.4 |
| 117.30 | | 46.5 | 58.2 | 23.3 | 17.4 | 23.3 | | | | | | | | | | | | | | 168.7 |
| 120.25 | 150.5 | 252.9 | 4.2 | | 2.1 | | | | | | | | | | | | | | | 409.7 |
| .40 | 19.6 | 4.0 | 2.0 | | | | | | | | | | | | | | | | | 25.6 |
| 133.25 | | 6.0 | | | 6.0 | | | | | | | | | | | | | | | 12.0 |
| 137.30 | | | | | 2.4 | 2.4 | 7.2 | 4.8 | | | | | | | | | | | | 16.8 |
| Total: | 332.9 | 1082.5 | 496.5 | 150.2 | 95.2 | 40.4 | 32.7 | 4.8 | | 8.1 | 5.9 | 5.0 | 13.9 | 7.1 | | | | | | 2275.2 |

Table III (Cont'd)
Record of Sardine Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 3.00 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|---------------------|-------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5507: | | | | | | | | | | | | | | | | | | | |
| 80.70 | | | | | | | 13.2 | | | | 6.0 | | | | | | | | 13.2 |
| 83.70 | | 6.0 | 5.5 | 6.0 | | | | | | | | | | | | | | | 18.0 |
| 87.70 | | | | | | | | | | | | | | | | | | | 5.5 |
| 90.60 | | | | 2.8 | 8.4 | 8.4 | 11.2 | 5.6 | | | | | | 2.8 | | | | | 39.2 |
| .65 | 21.0 | 6.0 | 12.0 | 6.0 | | | 3.0 | | | 3.0 | | | | | | | | | 51.0 |
| 93.60 | | | 5.6 | 5.6 | 5.6 | | 16.7 | | 11.2 | 22.2 | | | 11.1 | | | | | 5.6 | 83.6 |
| .80 | | | 2.7 | | 5.3 | | | 2.7 | | | | | | | | | | | 10.7 |
| 97.32 | 2.8 | 2.8 | | | | | | | | | | | | | | | | | 5.6 |
| 117.26 | | 17.5 | 21.9 | | 4.4 | 4.4 | | | | | | | | | | | | | 48.2 |
| .55 | | | | | | | | | | 2.5 | 5.0 | | | | | | | | 7.5 |
| 120.25 | 78.7 | 531.3 | 131.3 | 30.3 | 16.2 | 6.0 | 6.1 | | | | | | | | | | | | 799.9 |
| .30 | | | | | 4.7 | | | | | | | | | | | | | | 4.7 |
| .40 | 18.4 | 9.2 | | | | | | | | | | | | | | | | | 27.6 |
| .50 | | | | | | 3.0 | | | | | | | | | | | | | 3.0 |
| 123.50 | | | | 3.0 | 3.0 | | | | | 2.6 | | | | | | | | | 9.0 |
| .55 | | | | | | | | | | | | | | | | | | | 2.6 |
| 130.40 | 12.9 | 4.3 | 4.3 | | | | | | | | | | | | | | | | 21.5 |
| 133.25 | 5.1 | 5.1 | | | | | | | | | | | | | | | | | 10.2 |
| .30 | | 8.8 | | | | | | | | | | | | | | | | | 8.8 |
| .50 | | | | | | | | | | | 2.7 | | | | | | | | 2.7 |
| 137.30 | | | 5.2 | | | | | | | | | | | | | | | | 5.2 |
| Total | 138.9 | 591.0 | 188.5 | 53.7 | 42.9 | 29.5 | 50.2 | 8.3 | 11.2 | 30.3 | 13.7 | | 11.1 | 2.8 | | | | 5.6 | 1177.7 |
| Cruise 5510: | | | | | | | | | | | | | | | | | | | |
| 113.35 | | | 3.7 | | | | | | | | | 6.7 | | | | | | | 3.7 |
| 117.35 | | | | | | | | | | | | | | | | | | | 6.7 |
| 120.30 | 6.1 | 28.2 | 6.0 | 2.0 | | | | | | | | | | | | | | | 42.3 |
| .35 | | | | | | | 2.1 | | | | | | | | | | | | 2.1 |
| .45 | 2.4 | 23.5 | 7.1 | | | | | | | | | | | 2.4 | | | | | 35.4 |
| .80 | | | | | | | | | | | | | | 2.5 | | | | | 2.5 |
| 123.60 | | | | | | | | | | | | 5.0 | | | | | | | 5.0 |
| 127.40 | | | | | | | | | | | | | | | | | | | 5.7 |
| 133.25 | | | | | | | | | | | | | | | | | | | 3.2 |
| .30 | | | | | | | | | | | | 5.2 | 5.2 | | 3.2 | | | | 10.4 |
| 137.30 | | | | | | | | | | | | 2.9 | | 5.8 | 2.9 | | | | 11.6 |
| Total | 8.5 | 51.7 | 16.8 | 2.0 | | | 2.1 | | | | | 19.8 | 5.2 | 16.4 | 6.1 | | | | 128.6 |

Table III (Cont'd)
Record of Sardine Larvae, 1955

Midpoint of Size Class (in mm.)

| Station | 3.00 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | 25.25 | Dis. | Total |
|--------------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| Cruise 5512: | | | | | | | | | | | | | | | | | | | | |
| 113.30 | | | | | | | | | | 4.9 | 9.8 | 9.8 | | 4.9 | 4.9 | | | | | 34.3 |
| .60 | | | | | | | | | | | 2.6 | | | 2.6 | | | | | | 5.2 |
| 120.30 | | 5.4 | | | | 5.1 | | | | | | | | | | | | | | 5.4 |
| .35 | 5.1 | | 5.1 | | | | | | | | | | | | | | | | | 15.3 |
| .40 | 14.7 | 52.1 | 8.1 | | | | 1.6 | 1.6 | | | | | 1.6 | | | | | | | 79.7 |
| .45 | 5.8 | | | | | | | | 10.4 | 2.6 | | | | | | | | | | 5.8 |
| 123.37 | | 18.4 | | | | | 10.4 | | | | | | | | | | | | | 31.4 |
| .40 | | 3.5 | | | | | | | | | | | | | | | | | | 13.9 |
| 127.34 | | | 2.6 | | 5.2 | 10.4 | 2.6 | 2.6 | | | | | | | | | | | | 23.4 |
| 137.23 | | | | | 2.9 | | | | | | | | | | | | | | | 2.9 |
| 140.30 | | | 8.4 | 5.6 | 2.8 | | | | | | | | | | | | | | | 16.8 |
| Total | 25.6 | 79.4 | 24.2 | 5.6 | 10.9 | 15.5 | 13.0 | 4.2 | 12.0 | 7.5 | 12.4 | 11.4 | | 7.5 | 4.9 | | | | | 234.1 |

RECORD OF ANCHOVY LARVAE, 1955

The distribution and relative abundance of anchovy larvae are shown in figure 4. Six categories of abundance are used. Four categories - zero, light, moderate, and moderately heavy concentrations of larvae - parallel the usage for sardine larvae; the other two categories are heavy concentrations, 601-6000 larvae, and very heavy, over 6000 larvae. The value for each station is the cumulative standard haul total for the year.

Anchovy larvae are recorded by size classes in table IV. The size classes have the same midpoints and ranges as sardine larvae, except that the first category defined for sardine larvae (3.00 mm.) is divided into two size classes, with the following midpoints and ranges: 2.50 mm. (1.76-3.25 mm.) and 3.75 mm. (3.26-4.25 mm.).

Anchovy larvae were taken at 616 stations of the 1375 occupied during 1955. The occurrences and abundance of anchovy larvae are summarized by month and area in text table 4. The comparative abundance of anchovy and other fish larvae is summarized in text table 5. Anchovy larvae were taken in more hauls than any kind except rockfish larvae, and they were more abundant than the combined totals of the other species dealt with in this paper. This is shown in the following summary:

| Larvae | Total occurrences | Standard haul totals | Percent of total |
|------------------|-------------------|----------------------|------------------|
| Anchovy | 616 | 140,183 | 39.03 |
| Sardine | 254 | 14,121 | 3.93 |
| Jack mackerel | 369 | 13,246 | 3.69 |
| Pacific mackerel | 92 | 1,950 | 0.54 |
| Hake | 430 | 60,090 | 16.73 |
| Rockfish | 652 | 29,341 | 8.17 |
| All other | - | 100,224 | 27.91 |
| Total | (1375) | 359,155 | 100.00 |

Anchovy larvae constituted 39.03% of the larvae obtained during 1955, the other species dealt with in this paper made up 33.06%, while all other larvae (flatfish, myctophids, bathylagids, etc.) made up 27.91%.

Several interesting features of the regional and seasonal abundance of anchovy larvae are brought out in text table 4. Only negligible numbers of anchovy larvae were taken off central California (lines 60-77) during the four occupancies of this area in 1955; the area off southern Baja California (station lines 140-157) was similarly unproductive of anchovy larvae. Anchovy larvae were taken on all cruises in the four subareas located between Point Conception, California, and Point San Juanico, Baja California (station lines 80-137). Over two-thirds of the larvae were taken during the first three months of 1955. The winter peak in abundance was particularly marked in the northern Baja California and upper central Baja California subareas. In the other two subareas, abundance during June and July was as great as during January and February.

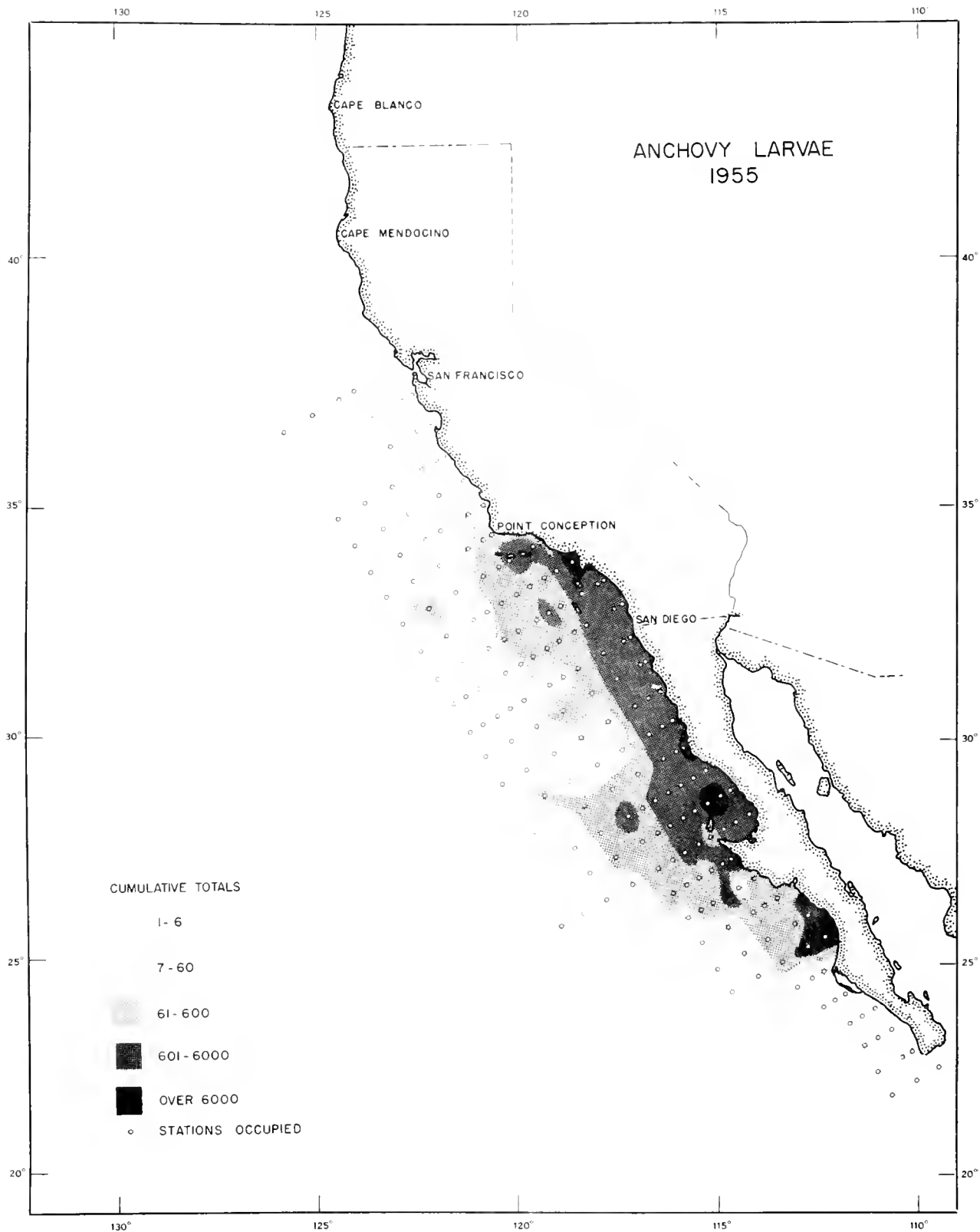


Figure 4.--Anchovy larvae, 1955: distribution and relative abundance

Text table 4.--Occurrence and abundance (standard haul totals) of anchovy larvae
(Engraulis mordax), by month and area, in hauls made during 1955

| Cruise | Central California 60-77 | | Southern California 80-93 | | Northern Baja California 97-107 | | Upper central Baja California 110-120 | | Lower central Baja California 123-137 | | Southern Baja California 140-157 | | Total | |
|---------|--------------------------------|-------------|---------------------------------|-------------|---------------------------------------|-------------|---|-------------|---|-------------|--|-------------|------------------|-------------|
| | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber |
| 5501 | - | - | 19 | 5,162 | 16 | 12,868 | 20 | 19,687 | 15 | 2,384 | 3 | 42 | 73 | 40,143 |
| 5502 | - | - | 22 | 3,822 | 13 | 5,060 | 24 | 20,303 | 14 | 1,766 | 0 | 0 | 73 | 30,951 |
| 5503 | - | - | 15 | 4,262 | 17 | 8,350 | 31 | 11,720 | 13 | 744 | 2 | 4 | 78 | 25,080 |
| 5504 | - | - | 19 | 1,750 | 19 | 2,024 | 37 | 12,498 | 13 | 218 | - | - | 88 | 16,490 |
| 5505 | 0 | 0 | 15 | 1,713 | 13 | 700 | 14 | 1,186 | 10 | 600 | - | - | 52 | 4,199 |
| 5506 | 2 | 10 | 26 | 6,743 | 16 | 576 | 12 | 1,262 | 10 | 4,064 | - | - | 66 | 12,655 |
| 5507 | 2 | 12 | 28 | 4,461 | 13 | 352 | 13 | 928 | 8 | 1,304 | - | - | 64 | 7,057 |
| 5508 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5509 | - | - | 22 | 720 | - | - | - | - | - | - | - | - | 22 | 720 |
| 5510 | 3 | 16 | 10 | 148 | 8 | 137 | 12 | 314 | 5 | 32 | - | - | 38 | 647 |
| 5511 | - | - | 26 | 1,155 | - | - | - | - | - | - | - | - | 26 | 1,155 |
| 5512 | - | - | 14 | 211 | 3 | 25 | 12 | 670 | 5 | 157 | 2 | 23 | 36 | 1,086 |
| Total | 7 | 38 | 216 | 30,147 | 118 | 30,092 | 175 | 68,568 | 93 | 11,269 | 7 | 69 | 616 | 140,183 |
| Percent | | 0.03 | | 21.51 | | 21.47 | | 48.90 | | 8.04 | | 0.05 | | 100.00 |

Text table 5.--Abundance (standard haul totals)
of fish larvae in 1955, summarized by month

| | Sardine | Anchovy | Jack mackerel | Pacific mackerel | Hake | Rockfish | All other fish larvae | Total |
|------------|---------|---------|------------------|---------------------|--------|----------|-----------------------------|---------|
| January | 2,329 | 40,143 | 0 | 136 | 13,356 | 6,281 | 10,286 | 72,531 |
| February | 3,132 | 30,951 | 619 | 14 | 28,973 | 6,206 | 10,099 | 79,994 |
| March | 1,576 | 25,080 | 1,075 | 215 | 12,535 | 3,653 | 13,792 | 57,926 |
| April | 2,685 | 16,490 | 3,395 | 608 | 4,757 | 3,533 | 12,125 | 43,593 |
| May | 582 | 4,199 | 1,063 | 86 | 176 | 1,895 | 13,464 | 21,465 |
| June | 2,275 | 12,655 | 5,386 | 667 | 19 | 1,732 | 14,028 | 36,762 |
| July | 1,178 | 7,057 | 1,706 | 221 | 3 | 2,676 | 16,531 | 29,372 |
| August | - | - | - | - | - | - | - | - |
| September* | 0 | 720 | 0 | 0 | 3 | 313 | 669 | 1,705 |
| October | 129 | 647 | 2 | 0 | 28 | 461 | 5,729 | 6,996 |
| November* | 0 | 1,155 | 0 | 0 | 5 | 1,897 | 553 | 3,610 |
| December | 235 | 1,086 | 0 | 3 | 235 | 694 | 2,948 | 5,201 |
| Total | 14,121 | 140,183 | 13,246 | 1,950 | 60,090 | 29,341 | 100,224 | 359,155 |
| Percent | 3.93 | 39.03 | 3.69 | 0.54 | 16.73 | 8.17 | 27.91 | 100.00 |

* - Totals for September and November are based on 43 stations occupied on lines 83-90.
Only a part of these stations is included in tables VII (hake) and VIII (rockfish).

Table IV
Record of Anchovy Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|--------------|--------|--------|-------|-------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5501: | | | | | | | | | | | | | | | | | | | | |
| 80.51 | 19.3 | 49.7 | 24.8 | 19.3 | 35.9 | 27.6 | 8.3 | 5.5 | | | | | | | | | | | | 190.4 |
| .55 | 6.2 | | 9.3 | | | | 6.2 | 3.1 | | | | | | | | | | | | 24.8 |
| .60 | | | | 3.2 | 3.2 | 6.4 | | | | | | | | | | | | | | 12.8 |
| 83.40 | 22.0 | 11.9 | 6.8 | 8.5 | | | | | | | | | | | | | | | | 49.2 |
| .43 | 6.6 | 6.6 | 6.6 | 16.5 | 9.9 | 29.6 | 13.2 | 13.2 | | | | | | | | | | | | 102.2 |
| 87.35 | 1179.7 | 1125.5 | 153.6 | 54.3 | 22.6 | 31.6 | 13.6 | 4.5 | 4.5 | | | | | | | | | | | 2589.9 |
| .40 | | 2.6 | | | | | 2.6 | 2.6 | | | | | | | | | | | | 7.8 |
| .50 | | 8.7 | 17.4 | 104.1 | 26.0 | 8.7 | 2.9 | 2.9 | | | | | | | | | | | | 170.7 |
| .60 | | | 11.5 | 3.8 | 7.7 | | | | | | | | | | | | | | | 23.0 |
| 90.28 | 10.9 | 38.4 | 16.4 | 10.9 | 5.5 | | | | | | | | | | | | | | | 82.1 |
| .30 | 52.0 | 88.1 | 61.0 | 9.0 | 6.8 | 4.6 | 2.3 | | 2.3 | | | | | | | | | | 4.5 | 230.6 |
| .37 | | 53.0 | 99.8 | 74.9 | 25.0 | 18.7 | 3.1 | 3.1 | 3.1 | | | | | | | | | | | 280.7 |
| .45 | 3.7 | 37.4 | 29.9 | 3.7 | | | | | | | | | | | | | | | | 74.7 |
| .50 | 7.8 | 80.9 | 70.5 | 26.1 | 2.6 | | 5.2 | 5.2 | | | 2.7 | | | | | | | | | 198.3 |
| .60 | | | | | | | | | | | | | | | | | | | | 2.7 |
| 93.27 | 13.8 | 69.4 | 107.6 | 170.0 | 149.3 | 69.4 | 59.0 | 38.2 | 13.9 | 3.5 | | | | | | | | | | 694.1 |
| .30 | 6.9 | 24.1 | 44.8 | 10.3 | 10.3 | 3.4 | | | | | | | | | | | | | | 99.8 |
| .40 | 17.7 | 8.9 | 3.0 | | | 6.0 | | | | | | | | | | | | | | 35.6 |
| .50 | 104.3 | 178.8 | 9.0 | | | | | | | | | | | | | | | | | 292.1 |
| 97.30 | 145.1 | 52.1 | 9.3 | 27.9 | 67.0 | 65.1 | 20.4 | | | | | | | | | | | | | 386.9 |
| .32 | 85.5 | 93.3 | 7.8 | 28.5 | 13.0 | 5.2 | 5.2 | | | | | | | | | | | | | 238.5 |
| .40 | 96.1 | 137.2 | 41.2 | 10.3 | 6.8 | | | | | | | | | | | | | | | 291.6 |
| .50 | | 25.8 | 25.8 | | 25.8 | 25.8 | 25.8 | | | | | | | | | | | | | 129.0 |
| 100.29 | 369.6 | 183.3 | 8.7 | 2.9 | 26.2 | 20.3 | 2.9 | 5.8 | 8.7 | | | | | | 2.9 | | | | | 631.3 |
| .30 | 244.0 | 223.5 | 73.5 | 44.1 | 17.6 | 2.9 | 8.8 | 5.9 | | 2.9 | | | | | | | | | | 623.2 |
| .40 | 6.0 | 68.1 | 41.4 | 8.9 | | 3.0 | | | 3.0 | | | | | | | | | | | 130.4 |
| .50 | | 44.3 | 22.1 | | | | | | | | | | | | | | | | | 66.4 |
| 103.30 | 13.2 | 24.3 | 19.8 | 31.0 | 72.9 | 42.0 | 13.3 | 13.2 | 4.4 | | | | | | | | | | | 234.1 |
| .35 | 852.6 | 505.8 | 196.6 | 52.0 | 8.7 | 2.9 | | | | | | | | | | | | | | 1618.6 |
| .40 | 2100.9 | 2273.0 | 86.1 | | | | | | | | | | | | | | | | | 4460.0 |
| 107.32 | 217.1 | 1274.3 | 156.8 | 241.2 | 44.2 | 32.2 | | 4.0 | | | | | | | | | | | | 1969.8 |
| .35 | 936.4 | 343.5 | 87.5 | 55.1 | 9.7 | 3.2 | 3.2 | 3.2 | | | | | | | | | | | | 1441.8 |
| .40 | 42.9 | 198.9 | 330.4 | 61.2 | | | | 3.1 | | | | | | | | | | | | 636.5 |
| .50 | | | 3.6 | 3.6 | | | | | | | | | | | | | | | | 7.2 |
| .60 | 2.9 | | | | | | | | | | | | | | | | | | | 2.9 |
| 110.33 | 53.4 | 32.1 | | 21.4 | 32.1 | 32.1 | 74.8 | 85.5 | 10.7 | 10.7 | | 10.7 | | | | | | | | 363.5 |
| .35 | 40.9 | 193.5 | 187.0 | 58.1 | 19.4 | 10.7 | 2.2 | | | 2.8 | 2.8 | | | | | | | | | 511.8 |
| .50 | | | | | | | | | | | | | | | | | | | | 5.6 |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|--|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5501 (cont'd): | | | | | | | | | | | | | | | | | | | | |
| 113.30 | 291.5 | 113.0 | 49.7 | 54.3 | 33.9 | 4.6 | 4.6 | 4.6 | | | | | | | | | | | | 556.2 |
| .35 | 649.6 | 464.0 | 92.8 | 116.0 | 46.4 | 23.2 | 46.4 | | | | | | | | | | | | | 1438.4 |
| .40 | 13.6 | 49.1 | 32.7 | 13.7 | 13.7 | | 5.5 | 2.7 | | | | | | | | | | | | 131.0 |
| .50 | 22.0 | 151.2 | 27.5 | 5.5 | 5.5 | | | | | | | | | | | | | | 2.8 | 214.5 |
| .60 | | | | | | | | | | 3.0 | | | | | | | | | | 3.0 |
| 117.26 | 6.4 | 16.2 | 64.8 | 132.8 | 90.8 | 55.0 | 42.1 | 25.9 | | 3.2 | | | | | | | | | | 437.2 |
| .30 | 388.6 | 420.5 | 417.6 | 1046.9 | 725.0 | 385.7 | 200.1 | 58.9 | 58.0 | | | 2.9 | | | | | | | | 3703.3 |
| .35 | 31.7 | 646.7 | 1014.4 | 377.3 | 336.1 | 399.5 | 409.0 | 538.9 | 323.4 | 247.3 | 152.2 | 53.9 | 53.9 | 41.2 | 50.7 | | | | | 4676.2 |
| .40 | | 310.0 | 441.0 | 476.8 | 348.7 | 140.1 | 80.5 | 38.7 | 38.7 | 38.7 | 8.9 | 6.0 | 3.0 | | | | | | | 1931.1 |
| .50 | | 3.2 | | 22.4 | 44.8 | 70.4 | 67.2 | 19.2 | 9.6 | 3.2 | 3.2 | | | 3.2 | | | | | | 246.4 |
| 120.25 | 106.4 | 393.7 | 351.1 | 436.3 | 396.4 | 305.9 | 282.0 | 212.8 | 34.6 | | 8.0 | | | | | | | | | 2527.2 |
| .30 | 231.7 | 532.1 | 331.8 | 363.0 | 194.0 | 131.4 | 43.9 | 6.3 | | | | | | | | | | | | 1834.2 |
| .35 | 14.6 | 11.7 | 5.8 | 5.8 | 17.6 | 8.7 | 8.7 | | 2.9 | | | | | | | | | | | 75.8 |
| .40 | 44.1 | 30.1 | 83.5 | 67.3 | 41.8 | 30.1 | 25.5 | 13.9 | 6.9 | | | | | | | | | | | 343.2 |
| .45 | | 12.3 | 33.9 | 43.2 | 46.2 | 92.4 | 101.6 | 160.2 | 58.6 | 33.9 | 21.5 | 9.3 | 6.2 | | | | | | | 619.3 |
| .50 | | | 6.6 | 3.3 | 16.5 | 13.2 | 9.9 | 3.3 | 9.9 | 3.3 | | | | | | | | | | 66.0 |
| .60 | | | | | | | 3.1 | | | | | | | | | | | | | 3.1 |
| 123.37 | 17.0 | 22.6 | 31.1 | 132.6 | 403.2 | 329.9 | 104.3 | 56.4 | 39.5 | 14.1 | 11.2 | 11.2 | 11.3 | 8.5 | | | | | | 1192.9 |
| .40 | 50.1 | 28.1 | 31.3 | 128.4 | 200.4 | 103.3 | 84.5 | 56.4 | 6.3 | 3.1 | 6.2 | 3.1 | | | | | | | | 701.2 |
| .45 | | | | 3.2 | 6.4 | 6.4 | 3.2 | | | | | | | | | | | | | 19.2 |
| .50 | | | 12.4 | 30.9 | 24.8 | 3.1 | | | | | | | | | | | | | | 71.2 |
| .55 | | | | 17.0 | 3.4 | | | | | | | | | | | | | | | 20.4 |
| 127.34 | | 2.6 | 34.0 | 33.9 | 36.5 | 44.4 | 33.9 | 13.0 | 10.4 | 10.4 | 2.6 | 7.8 | 2.6 | 2.6 | 2.6 | | | | | 237.3 |
| .40 | 3.0 | | | | | | | | | | | | | | | | | | | 3.0 |
| .45 | | | | 6.4 | 3.2 | | | | | | | | | | | | | | | 3.2 |
| .55 | | | | 2.5 | 6.3 | | | | | | | | | | | | | | | 12.7 |
| 130.30 | 2.5 | | | 2.5 | | 2.5 | 2.5 | | | | | | | | 2.5 | | | | | 12.5 |
| .35 | | | | | | | | | | | | | | | | | | | | 5.6 |
| 133.25 | | | | 2.5 | | 4.9 | 2.5 | | | 2.6 | | 2.5 | | | | | | | | 17.4 |
| .30 | | | | | | | | | | | | | | | | | | | | 5.2 |
| 137.23 | 2.7 | 5.4 | 16.3 | 16.4 | 2.7 | | | | 2.7 | | | | | | | | | | | 46.2 |
| .30 | | 15.2 | 15.2 | 3.0 | 3.0 | | | | | | | | | | | | | | | 36.4 |
| 140.30 | 17.0 | 6.8 | 3.4 | | | 3.4 | 3.4 | | | | | | | | | | | | | 34.0 |
| 143.26 | | | 2.3 | | | 2.3 | | | | | | | | | | | | | | 4.6 |
| 153.16 | | | 3.2 | | | | | | | | | | | | | | | | | 3.2 |
| Total: 8550.0, 10691.5 5072.0 4702.2 3695.5 2611.8 1837.4 1409.3 659.9 385.5 219.3 110.0 77.0 55.5 58.7 7.3 40142.9 | | | | | | | | | | | | | | | | | | | | |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dls. | Total |
|--------------|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5502: | | | | | | | | | | | | | | | | | | | | |
| 80.55 | | | | 12.9 | 6.5 | | 25.8 | | 45.2 | 19.4 | | 6.5 | | | | | | 9.0 | | 116.3 |
| .60 | | | | | | | | | | | | | | | | | | | | 9.0 |
| 83.40 | 34.6 | 92.4 | 39.3 | 39.3 | 43.9 | 34.7 | 23.1 | 20.8 | 4.6 | 6.9 | | 2.3 | | | | 2.3 | | | 4.6 | 348.8 |
| .43 | | 13.0 | 22.8 | | 6.6 | 26.1 | 19.6 | 9.8 | 6.5 | 3.3 | | | | | | | | | | 107.7 |
| .51 | 8.3 | 5.6 | 13.8 | 8.3 | | 8.3 | | 16.6 | 5.6 | 2.8 | 2.8 | | | | | | | | | 72.1 |
| .60 | | | | | | | | 3.2 | | | 6.4 | 3.2 | | | 3.2 | | | | | 19.2 |
| 87.35 | 18.2 | 36.5 | 72.9 | 103.4 | 139.8 | 130.8 | 73.0 | 79.1 | 39.5 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.2 | 3.0 | | 6.1 | 714.3 |
| .40 | 11.7 | 8.8 | 2.9 | 2.9 | 2.9 | 11.7 | 5.8 | 2.9 | | | | | | | | | | | | 49.6 |
| .50 | | | | | 8.5 | 2.8 | 5.6 | | 2.8 | 2.8 | | | | | 2.8 | | | | | 28.1 |
| .60 | | | | | | | | | 6.1 | | | | | | | | | | | 6.1 |
| 90.28 | 7.6 | 17.6 | 105.9 | 274.7 | 186.5 | 53.0 | 20.2 | 17.7 | 17.6 | 7.5 | | | | | | | | | | 708.3 |
| .30 | | 34.2 | 37.4 | 34.2 | 56.0 | 18.6 | 6.2 | 12.4 | 24.8 | 15.5 | 3.1 | | | | | | | | 6.2 | 248.6 |
| .37 | | | 5.9 | 47.5 | 26.8 | 20.8 | 41.6 | 29.7 | 20.7 | 8.9 | 11.9 | | | | | | | | 8.9 | 222.7 |
| .45 | 3.1 | 6.2 | 3.1 | | 6.2 | 3.1 | 6.2 | | | 6.2 | | | 3.1 | | | | | | | 37.2 |
| .70 | | | | | | 3.2 | | | | | | 3.2 | | | | | | | | 6.4 |
| 93.27 | | 14.0 | 15.8 | 12.3 | 1.8 | 10.6 | 3.5 | 1.8 | | | | | | | | | | | | 59.8 |
| .30 | | 2.7 | 8.0 | | 2.7 | | | 5.3 | | | | | | | | | | | | 18.7 |
| .50 | | | | | | | | | | | | | | | | | | | | 6.1 |
| 97.30 | 38.0 | 174.6 | 75.9 | 35.4 | 22.8 | 40.5 | 27.9 | 12.7 | 10.2 | 2.5 | | | | | | | | | 5.1 | 445.6 |
| .32 | 15.4 | 119.8 | 68.8 | 86.8 | 79.1 | 56.0 | 63.7 | 40.8 | 20.4 | | 2.6 | | | | | | | | | 553.4 |
| .40 | | | 6.3 | 12.5 | | | | | 18.8 | | | | | | | | | | | 37.6 |
| .50 | | 3.1 | | | 3.1 | | | | | | | | | | | | | | | 6.2 |
| 100.29 | 275.2 | 447.5 | 50.0 | 25.0 | 30.6 | 25.1 | 19.4 | 13.9 | 11.1 | | 2.8 | | | | | | | | | 900.6 |
| .30 | 239.9 | 58.6 | 19.6 | 16.8 | 19.5 | 19.6 | 8.4 | | 8.4 | | | | | | | | | | | 390.8 |
| .40 | 106.9 | 109.9 | 26.0 | 69.4 | 20.3 | | | | | | | | | | | | | | | 332.5 |
| .50 | | | | | | 3.0 | 3.0 | | 3.0 | 3.0 | | | | | | | | | | 12.0 |
| .60 | | 33.1 | 51.2 | 18.0 | 9.0 | 6.0 | | | 3.0 | | | | | | | | | | | 120.3 |
| .70 | | | | | | | | | | | | | | | | | | | | 6.8 |
| 103.30 | 63.0 | 76.9 | 69.9 | 51.2 | 48.9 | 20.9 | 11.7 | 13.0 | | | | | | | | | | | | 342.5 |
| .35 | 312.9 | 254.2 | | 13.0 | 13.0 | 13.0 | | | | | | | | | | | | | | 619.1 |
| .40 | 376.1 | | | | | | | | | | | 3.4 | | | | | | | | 379.5 |
| .60 | | 2.9 | 5.8 | 2.9 | 17.5 | | 2.9 | 2.9 | | | | | 2.9 | | | | | | | 37.8 |
| 107.32 | 282.2 | 430.7 | 50.5 | 104.0 | 38.6 | 62.3 | 26.7 | 32.6 | 8.9 | | | | | | | | | | | 1036.5 |
| .35 | 362.0 | 144.8 | 52.6 | 98.7 | 52.6 | 65.8 | 65.8 | 19.7 | | | | | | | | | | | | 862.0 |
| .40 | 3.3 | 10.0 | 3.3 | | 3.3 | | | | | | | | | | | | | | | 19.9 |
| 110.33 | 82.6 | 601.8 | 1038.4 | 1262.6 | 1180.0 | 778.8 | 460.2 | 106.2 | 129.8 | 11.8 | | | | | | | | | | 5664.0 |
| .35 | 218.3 | 532.9 | 391.6 | 584.2 | 295.3 | 224.7 | 218.3 | 128.4 | 64.2 | 44.9 | 32.1 | 6.4 | 6.4 | | 6.4 | | | | | 2754.1 |
| .40 | 867.8 | 477.8 | 282.8 | 253.5 | 120.3 | 13.0 | 13.0 | | 3.2 | | | | | | | | | | | 2031.4 |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. Total |
|---------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Midpoint of Size Class (in mm.) | | | | | | | | | | | | | | | | | | | |
| Cruise 5502 (cont'd): | | | | | | | | | | | | | | | | | | | |
| 110.50 | | | | | | 3.3 | | | | | | | | | | | | | 3.3 |
| .60 | | 3.0 | 3.0 | | 12.2 | 15.3 | 3.0 | 12.2 | | 3.0 | | | | | | | | | 51.7 |
| 113.30 | | 31.2 | 67.6 | 41.6 | 72.8 | 93.6 | 67.6 | 119.6 | 41.6 | 52.0 | 5.2 | | | | | | | | 603.2 |
| .35 | 268.6 | 1235.6 | 316.0 | 145.3 | 101.1 | 79.0 | 37.9 | 25.2 | 12.6 | 3.2 | | | | | 5.2 | | | | 2227.7 |
| .40 | 175.2 | 98.0 | 5.9 | 11.9 | 11.9 | 23.7 | | | | | | | | | | | | | 326.6 |
| .45 | 208.1 | 1704.4 | 140.7 | 94.9 | 168.3 | 153.0 | 52.0 | 15.3 | 3.1 | 6.1 | | | | | | | | | 2545.9 |
| .50 | 11.1 | 262.7 | 192.4 | 3.7 | 14.8 | 25.9 | 48.1 | 11.1 | 7.4 | 7.4 | | | | | | | | | 584.6 |
| .55 | | 3.4 | 3.4 | 3.4 | 6.7 | | | | | | | | | | | | | | 16.9 |
| .70 | | | | | | | | | | | 6.2 | 3.1 | | | | | | | 9.3 |
| 117.26 | | | 2.9 | | | 11.5 | 5.8 | 17.3 | 8.6 | 5.8 | 2.9 | 5.8 | 2.9 | | | | | | 63.5 |
| .30 | 3.4 | 16.9 | 30.3 | 43.8 | 43.8 | 43.8 | 40.4 | 23.6 | 3.4 | 3.4 | | | | | | | | | 252.8 |
| .35 | 77.0 | 338.4 | 308.2 | | 251.2 | 157.4 | 83.7 | 20.1 | 20.1 | 6.7 | 3.4 | | | | 3.4 | | | | 3.4 |
| .40 | | | | | 4.0 | 8.0 | 40.0 | 40.0 | 20.0 | 12.0 | | 12.0 | 12.0 | | 16.0 | 4.0 | 8.0 | | 176.0 |
| .45 | | | 3.5 | | 6.9 | 10.4 | 55.4 | 110.7 | 141.9 | 51.9 | 34.6 | 38.0 | 45.0 | 24.2 | 55.4 | 10.4 | 3.5 | | 591.8 |
| .50 | 9.4 | 94.2 | 69.1 | 37.6 | 37.7 | 31.4 | 37.7 | 40.8 | 28.2 | 12.6 | 18.9 | 3.1 | 3.1 | | 3.1 | 3.1 | | | 430.0 |
| .55 | | | | | | 10.2 | 13.6 | 6.8 | 13.6 | | | 3.4 | | | | | | | 47.6 |
| 120.25 | | 17.5 | | 2.9 | | | 5.8 | 2.9 | 2.9 | | | | | | | | | | 32.0 |
| .30 | | | 3.4 | 6.8 | 13.6 | 17.0 | 92.1 | 17.0 | 30.7 | 6.8 | 6.8 | 3.4 | | | | | | | 197.6 |
| .35 | | | | 12.2 | 18.3 | 36.6 | 97.6 | 67.1 | 97.6 | 36.6 | 12.2 | 6.1 | | | | | | | 384.3 |
| .40 | | | 5.3 | | 10.6 | | 5.3 | | | | | | | | | | | | 26.5 |
| .70 | | 5.3 | | | | | 3.1 | 3.1 | | | | | | | | | | | 9.3 |
| 123.37 | | | | | 3.1 | | 6.7 | | 3.3 | 1.7 | | | | | | | | | 33.4 |
| .40 | | 2.3 | 11.3 | 27.1 | 43.0 | 11.3 | 4.5 | 6.8 | 13.5 | 4.5 | 4.5 | | 2.3 | | | | | | 131.1 |
| .50 | | | | | | 3.4 | | 6.8 | 37.5 | 13.6 | 6.8 | 10.2 | | 3.4 | 3.4 | | | | 85.1 |
| .55 | | | | | 4.0 | 15.8 | 13.8 | 13.9 | 4.0 | | | | | | | | | | 51.5 |
| 127.34 | | | | 1.8 | | 3.7 | | | 1.8 | | 1.8 | | | | | | | | 10.9 |
| .40 | | 4.4 | 4.4 | 4.4 | | 8.9 | 6.7 | 6.7 | 4.4 | 2.2 | | | | | | | | | 44.3 |
| .45 | 5.1 | 127.0 | 320.1 | 76.2 | 15.3 | 30.5 | 55.9 | 81.3 | 15.2 | 20.4 | 15.2 | 20.3 | 5.1 | | | | | | 787.6 |
| .50 | | 77.0 | 108.4 | 17.1 | 14.3 | 22.8 | 37.1 | 31.3 | 8.5 | 17.1 | 14.2 | 8.6 | 5.6 | | 5.7 | | | | 367.7 |
| .55 | | | 2.2 | 15.4 | 48.4 | 30.8 | 17.6 | 13.2 | 2.2 | 4.4 | | | | | | | | | 134.2 |
| 130.30 | | | | | | | | 7.8 | | 5.8 | | | | | | | | | 2.0 |
| .30 | | | | | | | 11.9 | | 8.9 | 8.9 | 8.9 | 3.0 | 3.0 | | 3.0 | 3.0 | | | 41.7 |
| .40 | | | | | | | | 6.3 | 3.1 | 3.1 | 3.1 | 3.1 | 6.2 | | | | | | 24.9 |
| .50 | | | | | | | | 2.7 | 2.7 | 2.7 | | 5.4 | 5.4 | | | | | | 16.2 |
| 137.23 | | | | | | | | 2.7 | | | | | | | 10.8 | 2.7 | 5.4 | | 21.6 |
| Total: | 4008.0 | 7469.5 | 4148.8 | 4023.8 | 3359.4 | 2514.7 | 1994.8 | 1285.3 | 988.4 | 421.5 | 217.6 | 170.5 | 108.8 | 30.8 | 115.2 | 28.7 | 19.9 | 9.0 | 36.3 |
| | | | | | | | | | | | | | | | | | | | 30951.0 |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5503: | | | | | | | | | | | | | | | | | | | | |
| 80.51 | | | | | 1.6 | | | 3.1 | 3.1 | | 1.6 | | 1.6 | | | | | | | 12.6 |
| 83.40 | 16.2 | 38.7 | 55.0 | 18.7 | 12.4 | 2.4 | 5.0 | 2.4 | | | | | | | | | | | | 150.8 |
| .43 | | 13.6 | 6.8 | 6.8 | 3.4 | 3.4 | | | 13.6 | | | | | | | | | | | 47.6 |
| .51 | | | 3.0 | | | 9.1 | 12.1 | 15.1 | 6.0 | 3.0 | | | | | | | | | | 48.3 |
| .60 | | | | | 2.7 | | 2.7 | | | | | | | | | | | | | 5.4 |
| 87.35 | 104.2 | 286.8 | 210.9 | 135.1 | 73.5 | 19.0 | 11.8 | 11.8 | | 2.4 | 2.4 | | | | | | | | | 857.9 |
| .40 | | | | | | 5.8 | 2.9 | 2.9 | | | | 5.8 | | | | | | | | 17.4 |
| 90.28 | 130.6 | 483.9 | 206.1 | 180.3 | 110.4 | 27.6 | 18.4 | 22.1 | 7.4 | 11.0 | 7.3 | | 1.8 | | 2.7 | | | | | 1206.9 |
| .30 | | 2.7 | 10.9 | 5.5 | | 2.7 | | | 5.5 | | | | | | | | | | | 30.0 |
| .37 | 2.5 | | | 2.5 | | | | | | | | | | | | | | | | 5.0 |
| .50 | 8.6 | | 5.7 | 14.3 | 2.9 | 5.7 | | | | | | | | | | | | | | 37.2 |
| .60 | | | | | | | | | | | | | 5.8 | | | | | | | 11.6 |
| 93.27 | 194.3 | 119.0 | 63.0 | 64.7 | 49.0 | 42.0 | 26.2 | 54.3 | 31.5 | 5.3 | 1.8 | | 5.8 | | | | | | | 651.1 |
| .30 | 2.9 | 25.9 | 72.0 | 92.1 | 57.6 | 31.6 | 8.7 | 31.7 | 37.4 | 28.8 | 5.8 | 2.9 | | | | | | | | 397.4 |
| .40 | | 67.3 | 290.5 | 336.3 | 51.1 | 10.8 | 16.2 | 8.1 | 2.7 | | | | | | | | | | | 783.0 |
| 97.30 | 115.2 | 48.0 | 20.8 | 43.2 | 35.2 | 27.2 | 14.4 | 12.8 | 1.6 | | | | | | | | | | | 318.4 |
| .32 | 91.8 | 544.7 | 713.0 | 541.6 | 440.6 | 220.3 | 186.7 | 55.1 | | | | | | | | | | | | 2793.8 |
| .40 | | 4.5 | 8.9 | 13.5 | 22.4 | 17.9 | 13.4 | 2.2 | 4.5 | | | | | | | | | | | 87.3 |
| .70 | | | | | | | | | 2.4 | | | | | | | | | | | 2.4 |
| 100.29 | | 9.1 | 76.0 | 200.7 | 316.1 | 462.1 | 413.4 | 246.3 | 121.6 | 18.2 | 21.3 | 3.0 | 3.0 | 3.0 | | | | | | 1893.8 |
| .30 | 57.8 | 74.3 | 38.5 | 110.0 | 107.2 | 126.6 | 121.0 | 44.0 | 22.0 | 8.3 | | | | | | | | | | 709.7 |
| .40 | 7.8 | 7.8 | 13.1 | 52.4 | 83.8 | 62.9 | 26.2 | 20.9 | 7.9 | | | | | | | | | | | 282.8 |
| .50 | 3.0 | | 9.0 | 12.0 | 18.0 | 24.0 | 18.0 | 6.0 | | | | | | | | | | | | 90.0 |
| .60 | | | | | | 3.4 | 6.8 | 6.9 | | 6.8 | 3.4 | | | | | | | | | 27.3 |
| .70 | | | | | | | | | | | | | | | | | | | 2.9 | 2.9 |
| 103.30 | 209.9 | 152.5 | | | 6.6 | 2.2 | | 2.2 | | | | | | | | | | | | 375.6 |
| .35 | 161.7 | 161.7 | 85.8 | 115.5 | 95.7 | 66.0 | 39.6 | | | | | | | | | | | | | 726.0 |
| .50 | | | | | | | | 3.4 | | | | | | | | | | | | 17.0 |
| 107.32 | 121.0 | 84.0 | 53.8 | 37.0 | 16.8 | 3.4 | 3.4 | | | 3.4 | 3.4 | 3.4 | | 3.4 | | | | | | 319.4 |
| .35 | 141.4 | 410.5 | 65.6 | 41.4 | 17.3 | | | 6.9 | | | | | | | | | | | | 683.1 |
| .40 | | | 2.9 | 8.7 | | 2.9 | | 2.9 | | | | | | | | | | | | 17.4 |
| .50 | | | | | | | | | | | | | | | | | | | | 3.5 |
| 110.33 | 7.4 | 54.3 | 34.6 | 46.9 | 56.8 | 54.4 | 37.1 | 37.1 | 14.8 | 12.4 | 2.5 | | | | | | | | | 358.3 |
| .35 | 957.7 | 335.5 | 61.0 | 91.5 | 109.8 | 30.5 | 18.3 | 6.1 | | | | | | | | | | | | 1610.4 |
| .40 | 58.0 | 270.5 | | | | | | | | | | | | | | | | | | 328.5 |
| .50 | | | | | 11.2 | 11.2 | 16.8 | 14.0 | 8.4 | | | | | | | | | | | 61.6 |
| .60 | | | | | | 6.8 | 6.8 | 10.2 | | | | | | | | | | | | 23.8 |
| .70 | | | | 3.3 | | | | | | | | | | | | | | | | 3.3 |
| 113.30 | | | | | | | | | | | | | | | | | | | | 15.0 |
| .35 | 26.6 | 55.7 | 108.9 | 176.7 | 205.7 | 140.4 | 62.9 | 72.6 | 55.6 | 33.9 | 21.7 | 17.0 | 4.8 | | | | | | | 982.5 |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|---------|
| Cruise 5503 (cont'd): | | | | | | | | | | | | | | | | | | | | |
| 113.40 | 151.2 | 126.0 | 189.0 | 214.2 | 226.8 | 163.8 | 75.6 | | 37.8 | | | | | | | | | | | 1184.4 |
| .45 | 67.9 | 365.0 | 345.6 | 171.2 | 58.2 | 32.3 | 16.2 | 3.2 | 3.2 | | | | | | | | | | | 1062.8 |
| .50 | 3.1 | 122.1 | 43.8 | 34.4 | 15.7 | 12.5 | 25.1 | 15.7 | 15.6 | 18.8 | | | | | | | | | | 306.8 |
| .55 | | | | 13.1 | 13.2 | 9.9 | 26.3 | 62.4 | 32.8 | 26.2 | 3.3 | | 3.3 | | | | | | | 190.5 |
| .60 | 3.5 | 58.8 | 20.8 | | | | 7.0 | 3.5 | 3.5 | | | | | | | | | | | 97.1 |
| 117.26 | | 26.2 | 49.1 | 42.5 | 13.1 | 36.0 | 45.8 | 29.5 | 26.1 | 9.8 | 19.6 | 9.8 | 3.3 | | | | | | | 310.8 |
| .30 | 216.7 | 358.0 | 153.8 | 266.9 | 204.1 | 141.3 | 91.1 | 28.3 | 9.4 | | | | 3.1 | | | | | | | 1472.7 |
| .35 | | 3.6 | 21.6 | 32.5 | 10.8 | 14.4 | | | 3.6 | 3.6 | | | | | | | | | | 90.1 |
| .40 | 60.5 | 67.2 | 30.3 | 30.3 | 43.7 | 104.2 | 67.2 | 16.8 | 10.1 | 3.4 | | | | | | | | | | 433.7 |
| .45 | 48.5 | 542.7 | 449.0 | 394.1 | 200.3 | 96.9 | 45.2 | 9.7 | 6.5 | | | | | | | | | | | 1792.9 |
| .50 | | | | 3.1 | | | 3.1 | | 12.4 | 12.3 | 6.2 | | | | | | | | | 37.1 |
| .55 | | 2.8 | 33.1 | 52.4 | 13.8 | 16.6 | 27.6 | 16.6 | 5.6 | | 2.8 | | | | | | | | | 174.1 |
| .60 | | | 19.2 | 34.6 | 11.5 | 19.2 | 26.9 | 15.4 | 11.5 | 11.5 | 3.8 | | | | | | | | | 153.6 |
| 120.25 | | | | | | | 19.0 | | 18.9 | | | | | | | | | | | |
| .30 | 35.1 | 9.6 | 6.4 | 12.8 | 35.1 | 35.1 | 51.0 | 67.0 | 98.9 | 95.7 | 102.0 | 44.6 | 19.2 | 9.6 | 6.4 | | | 6.3* | | 593.4 |
| .35 | | | | | 7.0 | 7.0 | | 3.5 | | | 7.0 | | | | | | | | | 24.5 |
| .40 | 2.7 | 21.7 | 18.9 | 18.9 | 5.4 | 5.4 | 2.7 | | 5.4 | | | | | | | | | | | 75.7 |
| .45 | | 3.0 | | | 6.1 | 6.1 | 3.0 | 6.1 | | | | | | | | | | | | 18.2 |
| .50 | | 2.8 | | 25.0 | 13.9 | | 8.4 | 2.8 | 5.6 | | | | | | | | | | | 58.5 |
| .55 | 9.1 | 21.2 | 15.2 | 33.4 | 12.2 | 15.2 | 15.2 | 24.3 | 15.1 | 6.1 | 3.0 | 3.0 | | | | | | | | 157.8 |
| .60 | 2.9 | 2.9 | 14.5 | 17.5 | 8.7 | | | 2.9 | 2.9 | | | | | | | | | | | 52.3 |
| .70 | | | | | | | | | | | | 3.0 | | | | | | | | 3.0 |
| .100 | | | | | | | | | 2.8 | | | | | | | | | | | 2.8 |
| 123.37 | | | | | | | | 2.0 | 2.0 | 2.0 | | | 2.0 | | | | | | | 8.0 |
| .40 | | | | | | | 3.4 | | 3.4 | 17.0 | 34.1 | 10.2 | 17.0 | 3.4 | | 17.0 | | 6.8** | | 122.5 |
| .45 | | | | | 2.9 | 2.9 | 14.7 | 20.6 | 20.6 | 17.7 | 8.8 | 2.9 | | | | | | | | 91.1 |
| .50 | | | | | | | | | 3.6 | 10.6 | 5.3 | 1.8 | 1.8 | 1.8 | 1.8 | | | | | 26.7 |
| .55 | | | 2.7 | 13.4 | 16.1 | 13.4 | 2.7 | 8.1 | 8.1 | 8.0 | 5.4 | | 5.4 | 2.7 | 2.7 | | | | | 88.7 |
| .60 | 2.7 | 78.0 | 104.9 | 48.5 | 8.1 | 8.1 | 13.5 | 2.7 | | | | | | | | | | | | 258.4 |
| 127.45 | | | | | | | | | | | | | | | | | | | | 2.7 |
| .55 | | | | | | | | | 2.8 | 2.8 | 5.6 | | | | | | | | | 11.2 |
| .60 | | | | | | | 5.6 | 5.6 | 2.8 | 5.6 | 5.6 | 5.6 | 2.8 | | | | | | | 33.6 |
| 130.30 | | | | | | | | 17.8 | 3.0 | 3.0 | | | | | | | | | 3.0 | 26.8 |
| 133.25 | | | | | | | 14.7 | 12.8 | 11.0 | 5.5 | 1.8 | | | | | | | | | 45.8 |
| .30 | | | | | | | | 2.6 | 2.6 | 5.2 | 5.2 | | | | | | | | | 15.6 |
| .40 | | | | | | | | 2.5 | 2.5 | 7.5 | 2.5 | | | | | | | | | 12.5 |
| 147.20 | | | | | | 2.5 | | | | | | | | | | | | | | 2.5 |
| 150.30 | | | | | | | | | 1.9 | | | | | | | | | | | 1.9 |
| Total | 2970.0 | 4975.9 | 3713.0 | 3838.3 | 2890.0 | 2176.8 | 1702.8 | 1081.0 | 747.8 | 408.8 | 300.6 | 117.4 | 74.9 | 23.9 | 13.6 | 17.0 | | 23.3 | 5.9 | 25081.0 |

* - 6.3 - 27.25 mm. group

** - 3.4 - 25.5 mm. group; 6.8 - 27.25 mm. group

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dls. | Total |
|--------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| Cruise 5504: | | | | | | | | | | | | | | | | | | | | |
| 80.51 | | | | | | | 13.1 | 3.4 | | | | | | | | | | | | 3.4 |
| .55 | | | | | | | 2.5 | 6.6 | | | | | | | | | | | | 19.7 |
| 83.43 | | | | | 2.5 | | | 5.0 | | | | | | | | | | | | 10.0 |
| .51 | | | | | 5.8 | | | 23.1 | | | | | | | | | | | | 46.3 |
| .60 | | | | | | | | 24.2 | 11.6 | 5.8 | | | | | | | | | | 96.8 |
| 87.35 | 30.8 | 117.6 | 137.2 | 224.0 | 103.6 | 72.8 | 39.2 | 11.2 | 12.1 | 24.2 | | 24.2 | 12.1 | | | | | | | 736.4 |
| .40 | | | | 2.4 | | | 7.1 | 7.1 | 4.8 | 7.1 | 2.4 | | | | 2.4 | | | | 4.7 | 38.0 |
| .50 | | | | | 2.4 | 7.2 | 4.8 | 12.0 | 9.6 | 7.2 | 9.6 | 2.4 | | 2.4 | 2.4 | | | | | 60.0 |
| .60 | | | | | | 2.7 | | | 2.7 | | | | | | | | | 2.7* | | 8.1 |
| .70 | | | | | | | | | | 6.1 | | | | | | | | | | 6.1 |
| .80 | | | | | | | | | | | | | | | | | | | | 3.1 |
| 90.30 | 25.7 | 102.4 | 161.2 | 92.2 | 3.1 | 12.8 | 7.7 | | | | | | | | | | | | | 425.1 |
| .37 | | 2.8 | | 11.2 | 5.6 | 8.4 | 5.6 | 22.3 | 22.4 | 22.4 | 2.8 | 2.8 | | | | 2.9 | | | | 106.3 |
| .45 | | | | 2.9 | | 2.9 | | | | | | | | | | | | | | 8.7 |
| .50 | | | | 3.0 | | | | | | | | | | | | | | | | 3.0 |
| 93.27 | 2.7 | 26.8 | 10.8 | 5.4 | 8.1 | 16.1 | 10.7 | 13.4 | 13.4 | 2.7 | | | | | | | | | | 110.1 |
| .30 | | 5.2 | 5.2 | 5.2 | 2.6 | 15.6 | 15.6 | 7.8 | | | 5.2 | | 2.6 | | | | | | | 49.4 |
| .40 | | 3.2 | | | | | | 6.5 | 3.2 | | | | | | | | | | 3.2 | 16.1 |
| .50 | | | 3.1 | | | | | | | | | | | | | | | | | 3.1 |
| 97.30 | | 5.0 | 2.5 | | | | | | | | | | | | | | | | | 7.5 |
| .32 | 71.7 | 268.3 | 31.2 | 40.5 | 43.6 | 37.4 | 56.1 | 15.6 | 9.3 | | | | | | 2.5 | 2.5 | | | | 573.7 |
| .40 | | 15.1 | 17.6 | | | | | 2.5 | | | | | | | 2.7 | | | | | 40.2 |
| .50 | | | | | | | | 2.7 | | | | | | | | | | | | 2.7 |
| .60 | | | | | | | 3.0 | | | | 3.0 | | | | | | | | | 6.0 |
| .70 | | | | | | | | | | 6.4 | | | | | | | | | | 6.4 |
| 100.29 | | | 3.4 | 3.4 | 6.8 | 3.4 | | 10.2 | 3.4 | | | | | | | | | | | 37.4 |
| .30 | | | | 7.5 | 12.5 | 10.0 | 2.5 | | 10.0 | 7.5 | 5.0 | 2.5 | | | | | | | | 57.5 |
| .40 | 14.6 | 51.2 | 43.9 | 21.9 | 4.9 | 4.9 | 4.9 | 14.6 | | | | | | | | | | | | 160.9 |
| .50 | | | | 3.2 | 3.2 | | 3.2 | | 3.2 | | | | | | | | | | | 12.8 |
| B103.30 | 41.6 | 56.3 | 22.0 | 17.1 | 12.2 | 27.0 | 17.2 | 7.3 | | | | | | | | | | | | 200.7 |
| H .30 | 2.5 | 2.5 | | 5.0 | | | | 5.0 | | | | | | | | | | | | 15.0 |
| H .35 | | | 3.7 | | 3.7 | | 3.7 | | | | | | | | | | | | | 11.1 |
| H .40 | | | 2.9 | | | | | | | | | | | | | | | | | 2.9 |
| B .55 | | | | | | | | | | | 3.0 | | | | | | | | | 3.0 |
| B .60 | | | | | 2.6 | 10.6 | 15.8 | 7.9 | | | | | | | | | | | | 36.9 |
| B107.35 | 51.1 | 113.0 | 24.2 | 8.1 | | | | | | | | | | | | | | | | 196.4 |
| B .80 | | | | 4.9 | 27.1 | 195.1 | 227.2 | 103.7 | 19.8 | 5.0 | 2.5 | | | | | | | | | 585.3 |
| H .80 | | | | | | | 12.3 | 18.4 | 18.4 | 3.1 | 9.2 | 6.2 | | | | | | | | 67.6 |
| B110.33 | 15.7 | 56.6 | 44.0 | 43.9 | 18.8 | 34.6 | 37.7 | 15.7 | 6.2 | | | | | | | | | | | 273.2 |
| H .35 | 8.0 | 2.0 | | 6.0 | | 4.0 | 2.0 | | | | | | | | | | | | | 22.0 |
| B .40 | | | | | | | | | 3.7 | 7.4 | 7.4 | | | | | | | | | 18.5 |
| H .50 | | | | 3.5 | | | 7.1 | 10.6 | 17.7 | | | | | | | | | | | 38.9 |
| B .60 | | | | 10.7 | 14.3 | 32.1 | 25.0 | 14.3 | 7.1 | 5.3 | 7.2 | | | 3.6 | | | | | | 114.3 |
| H .70 | | | | 7.9 | 47.6 | 29.0 | 39.6 | 10.6 | 5.2 | 2.6 | | 7.9 | | | | | | | | 155.7 |
| H .80 | | | | 2.3 | 2.3 | | | | 2.3 | | | | | | | | | | | 4.6 |
| H113.35 | | | | 3.8 | 3.8 | 3.8 | 3.8 | | | | | | | | | | | | | 15.2 |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

| Station | Midpoint of Size Class (ln mm.) | | | | | | | | | | | | | | | | | Total |
|-----------------------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 23.25 | 21.25 | |
| Cruise 5504 (cont'd): | | | | | | | | | | | | | | | | | | |
| H113.40 | | 5.3 | 21.2 | 10.6 | | | 10.6 | | 10.6 | | | | | | | | | 58.3 |
| H .45 | 6.1 | 63.9 | 12.2 | | | 3.0 | 3.0 | | | | | | | | | | | 88.2 |
| H .55 | | | | 2.9 | | 2.9 | 2.9 | 2.9 | 5.8 | | | | 2.9 | | | | | 20.3 |
| H .60 | 5.4 | | 59.8 | 146.9 | 24.5 | 19.1 | 29.9 | 27.2 | 8.1 | 8.1 | 2.7 | 8.1 | | | | | | 339.8 |
| B .60 | | | 11.3 | 56.4 | 93.1 | 188.9 | 183.3 | 84.6 | 28.2 | 22.6 | 8.4 | 2.8 | | | 2.8 | | | 685.2 |
| H .70 | | | 61.9 | 160.1 | 102.0 | 94.7 | 47.3 | 18.2 | 3.6 | 3.6 | | | 3.6 | | | | | 495.0 |
| H117.26 | | | | | | 28.4 | 14.2 | 7.1 | 7.1 | | 14.2 | | | | | | | 71.0 |
| H .35 | 349.9 | 372.4 | 22.5 | | 3.2 | 16.0 | 9.6 | | | | | | | | | | | 773.6 |
| H .40 | 126.7 | 377.5 | 174.2 | 81.9 | 21.1 | 60.7 | 66.0 | 63.4 | 21.1 | 2.6 | 5.3 | | | | | | | 1000.5 |
| H .45 | | 12.3 | 6.2 | 6.2 | 12.3 | 15.4 | 3.1 | | | | | | | | | | | 55.5 |
| H .50 | 3.6 | 32.9 | 102.2 | 18.3 | 3.6 | 14.6 | 25.5 | 36.4 | 11.0 | | | | | | | | | 248.1 |
| H .55 | | | 34.4 | 103.3 | 63.1 | 34.4 | 51.7 | 28.7 | 11.5 | 5.7 | 5.7 | | | | | 5.7 | | 344.2 |
| H .60 | | | 2.9 | 8.7 | 55.3 | 130.9 | 139.7 | 52.4 | 14.5 | 2.9 | 5.8 | | | | | | | 413.1 |
| B .60 | | 3.5 | | | 11.0 | 22.0 | 143.0 | 132.0 | 121.0 | 11.0 | 11.0 | | | | | | | 462.0 |
| H .70 | | | 28.1 | 80.7 | 80.8 | 42.1 | 73.7 | 38.6 | 21.0 | | | | | | | | | 368.5 |
| H120.25 | | | | | | 4.9 | 14.7 | 9.8 | 24.5 | 19.6 | 9.8 | 4.9 | 4.9 | | | | | 93.1 |
| H .30 | | | | | | | | | 23.8 | 23.8 | 23.8 | | | 23.8 | | | | 95.2 |
| H .35 | | | | | | | | | 14.6 | | | | | | | | | 14.6 |
| B .35 | | 7.5 | 90.2 | 263.2 | 240.6 | 112.8 | 60.1 | 75.2 | 67.7 | 30.1 | 22.5 | 15.0 | | 7.5 | | | | 992.4 |
| H .45 | | | | | | | 9.9 | | 9.9 | | | | | | | | | 19.8 |
| B .45 | | | | | | | | | | | | | | | | | | 11.7 |
| H .50 | | | | | | 7.6 | 3.8 | 22.8 | 22.8 | 7.6 | 3.8 | | | | | | 3.8 | 72.2 |
| B .50 | 116.3 | 875.3 | 415.5 | 858.7 | 858.7 | 520.8 | 133.0 | 72.0 | 116.3 | 66.4 | 11.0 | 5.5 | | | | | | 4049.5 |
| H .55 | | | | | | 4.6 | | | 11.5 | 13.8 | 6.9 | 2.3 | 2.3 | 4.6 | 2.3 | | | 48.3 |
| B .55 | | | | | 2.8 | 5.7 | 14.2 | 8.5 | 5.7 | 5.7 | | | | | | | | 36.9 |
| H .60 | | | | | 2.8 | 8.6 | 2.8 | 2.8 | 2.8 | | | | | | | | | 25.5 |
| B(1).60 | | | | 2.8 | 5.6 | 8.4 | 2.8 | 8.4 | | | 2.8 | | | | | | | 30.8 |
| B(2).60 | | | | | | | | | | | | | | | | | | 50.6 |
| B .65 | 10.2 | | 5.7 | 62.2 | 198.1 | 212.3 | 169.8 | 141.5 | 67.9 | 25.5 | 5.6 | 2.8 | | | | | | 891.4 |
| H123.37 | | | | | 2.6 | | 2.6 | 2.6 | | | | | | | | | | 7.8 |
| H .40 | | | | | | 4.7 | 14.2 | 9.5 | 4.7 | 4.7 | 4.7 | | | 4.7 | | | | 42.5 |
| H .45 | | | | | | 2.7 | | | 6.1 | 2.7 | 2.7 | | | | | | | 18.9 |
| B .50 | | | | | | 2.6 | 2.6 | 5.2 | | | | | | | | | | 7.8 |
| H .60 | | | | | | | 2.7 | 2.7 | | | | | | | | | | 2.7 |
| H127.34 | | | | 4.4 | | | | | | | | | | | | | | 4.4 |
| H .50 | | | | | | | | 3.5 | | | 3.5 | | | | | | | 7.0 |
| H .55 | | | | | | 3.4 | | 3.4 | 3.4 | 3.4 | 13.4 | 6.8 | | | | | | 33.8 |
| H .60 | | | | | | | | 2.7 | 2.7 | 13.5 | 2.7 | 2.7 | | | | | | 21.6 |
| H130.30 | | | | 1.6 | | | | | | | | | 1.6 | | | | | 3.2 |
| H .35 | | 2.1 | 4.3 | | 4.3 | | | | 4.3 | | | | | | | | | 12.9 |
| H .40 | 21.4 | | 17.2 | 4.3 | 6.4 | 2.1 | | | | | | | | | | | | 53.5 |
| B .55 | | | | | | | | | | | | | | | 2.4 | | | 2.4 |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

| Station | Midpoint of Size Class (in mm.) | | | | | | | | | | | | | | | | | | | Total |
|--------------|---------------------------------|-------|------|------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dls. | |
| Cruise 5505: | | | | | | | | | | | | | | | | | | | | |
| 83.43 | | | 4.9 | 19.5 | 53.7 | 97.6 | 78.1 | 34.1 | 9.8 | 9.8 | | 9.8 | | | | | | | | 317.3 |
| 87.35 | 2.4 | 4.9 | 9.8 | 39.2 | 24.4 | 46.6 | 22.1 | 19.6 | 7.3 | 7.3 | 4.9 | | | | | 2.4 | | | | 190.9 |
| .40 | | 3.2 | | 12.8 | 19.2 | 38.2 | 25.6 | 6.4 | 3.2 | 3.2 | | 6.4 | | | | | | | | 118.2 |
| .45 | | | | 4.7 | 4.7 | | 4.8 | 2.4 | | | 4.7 | | | | | | | | | 21.3 |
| .50 | | | | | 2.6 | | 5.2 | | | | | | | | | | | | | 7.8 |
| .60 | | | | | | | | | | | | | | | 3.1 | | | | | 3.1 |
| 90.28 | | 2.7 | 2.7 | | | 5.4 | 2.7 | | | 2.7 | | | | | | | | | | 16.2 |
| .30 | | 17.4 | 14.5 | 2.9 | 2.9 | 5.8 | 8.7 | | 2.9 | 5.8 | 2.9 | | | | | | | | | 63.8 |
| .37 | | 2.6 | 13.2 | 29.1 | 23.9 | 15.9 | 10.6 | 13.2 | 2.6 | 5.2 | | 2.6 | | | | | | | | 118.9 |
| .45 | | | | 16.7 | 2.8 | 2.8 | 5.6 | 2.8 | | 2.8 | | | | | | | | | | 30.7 |
| 93.27 | 22.6 | 29.0 | 19.4 | 9.7 | 6.4 | 3.2 | | 3.2 | 3.2 | 3.2 | | | | | | | | | | 99.9 |
| .30 | 18.6 | 12.4 | 12.4 | 12.4 | 18.6 | 24.8 | 6.2 | 18.6 | 37.2 | 18.6 | 6.2 | 6.2 | | | | | | | | 192.2 |
| .35 | | 3.0 | 6.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | | | | | | | | | | | 21.0 |
| .40 | 2.8 | 8.4 | 28.1 | 98.4 | 134.9 | 89.9 | 47.7 | 36.5 | 30.9 | 25.2 | | 2.8 | 2.8 | | | | 3.1 | | | 508.4 |
| .50 | | | | | | | | | | | | | | | | | | | | 3.1 |
| 97.30 | | 2.6 | | | 10.2 | 30.6 | 61.2 | 74.0 | 58.6 | 25.5 | 17.9 | 25.5 | 10.2 | | 5.2 | | | | | 321.5 |
| .32 | | | | | 3.2 | 9.5 | 12.6 | 12.6 | 15.8 | 15.8 | 6.4 | | 9.5 | | | | | | | 85.4 |
| .35 | | | | 2.8 | | 5.6 | 2.8 | 8.4 | | 2.8 | 2.8 | | | | | | | | | 25.2 |
| .40 | | | | | 6.0 | 6.0 | 9.0 | | 3.0 | 3.0 | | | | | | | | | | 89.6 |
| .45 | 47.7 | 14.9 | | | | | 6.6 | | 6.6 | | | | | | | | | | | 13.2 |
| 100.30 | | | | | | | | | | | 3.2 | | | | | | | | | 3.2 |
| .50 | | | | | | | | 3.8 | | | | | | | | | | | | 3.8 |
| .55 | | | | | | | | | | 2.6 | | | | | | | | | | 2.6 |
| 103.30 | | | | | | | | | | 15.3 | | 3.0 | | | | | | | | 18.3 |
| .50 | | | | | | | | | | | | | | 3.2 | | | | | | 3.2 |
| .55 | | | | | | | | | 3.2 | | | | | | | | | | | 3.2 |
| 107.32 | | | | | | | | | 6.6 | | | | | | | | | | | 6.6 |
| .35 | | | | | | | | 6.2 | 31.1 | 43.5 | 37.3 | 6.2 | | | | | | | | 124.3 |
| 110.33 | | | | | | | | 5.6 | 11.2 | 22.3 | 5.6 | 5.6 | | | | | | | | 50.3 |
| .35 | | | | | | | | | | 18.4 | | | | | | | | | | 27.7 |
| 113.30 | | | | | | | | 9.6 | 23.9 | 33.5 | 28.6 | 4.8 | 23.9 | 3.1 | 3.1 | 3.1 | | | | 148.3 |
| 117.26 | 12.4 | | 49.8 | 12.4 | 49.8 | 37.3 | | | | | | | | 4.8 | 14.4 | 4.8 | | | | 161.7 |
| .30 | | | | | 12.6 | 12.6 | | | | | | | | | | | | | | 25.2 |
| .40 | | | | | | | | | | 3.3 | | | | | | | | | | 3.3 |
| 120.25 | | | | 22.2 | 22.2 | | | | | | | | | | | | | | | 44.4 |
| .27 | | 145.6 | 52.9 | 92.7 | | | | 13.2 | | | | | | | | | | | | 304.4 |
| .30 | 9.1 | 145.9 | 91.2 | 45.6 | 18.2 | | 9.1 | 9.1 | | | | | | | | | | | | 328.2 |
| .35 | | | | 11.8 | 11.8 | | | | | | | | | | | | | | | 23.6 |
| .40 | | | | | | | | | 9.2 | 9.2 | | | | | | | | | | 18.4 |
| .55 | | | | | | | | 22.6 | | | | 6.4 | 12.9 | | | 6.4 | | | | 22.6 |
| .70 | | | | | | | | | | | | | | | | 2.7 | | | | 25.7 |
| .80 | | | | | | | | | | | | | | | | | | | | 2.7 |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dls. | Total |
|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5505 (cont'd): | | | | | | | | | | | | | | | | | | | | |
| 123.40 | | | 2.4 | | | | 14.7 | 4.9 | 9.8 | 14.7 | 4.9 | 4.9 | 4.9 | 4.9 | | | | | | 63.7 |
| 127.40 | | | | | | | | | | 6.2 | | | | | | | | | | 2.4 |
| .50 | | | | | | | | | | | | | | | | | | | | 6.2 |
| 130.30 | | | | | | | | 4.9 | | | 10.6 | 10.6 | 10.6 | | 21.2 | 10.6 | | | | 63.6 |
| .35 | | | | | | | | | | | | | 4.9 | | | 4.9 | | | | 14.7 |
| 133.25 | | | 5.9 | | | | | | | | | | | | | | | | | 5.9 |
| .30 | | | | 2.9 | | | 5.8 | 8.7 | | | | | | | | | | | | 17.4 |
| 137.23 | 40.8 | 51.0 | 10.2 | | | | | | | | | | | | | | | | | 102.0 |
| .30 | 169.6 | 119.6 | 25.0 | 2.8 | | | | | | | | | | | | | | | | 322.6 |
| .40 | | | | | | | 3.0 | | | | | | | | | | | | 5.6 | 3.0 |
| Total | 326.0 | 563.2 | 348.4 | 441.6 | 428.1 | 431.8 | 345.1 | 323.4 | 279.1 | 297.1 | 136.0 | 94.8 | 82.8 | 12.9 | 47.0 | 34.9 | 3.1 | | 5.6 | 4200.9 |
| Cruise 5506: | | | | | | | | | | | | | | | | | | | | |
| 77.55 | | | | | 3.2 | | | 3.2 | | | | | | | | 3.6 | | | | 6.4 |
| .90 | | | | | | | | | | | | | | | | | | | | 3.6 |
| 80.51 | 6.9 | 7.0 | | 13.8 | 7.0 | 6.9 | 10.4 | 3.5 | | | | | | | | | | | | 55.5 |
| 83.40 | | | | | 1.5 | | | | | | | | | | | | | | | 1.5 |
| .43 | 21.5 | 104.3 | 172.0 | 214.9 | 107.4 | 98.2 | 46.0 | 46.0 | 15.3 | | 3.1 | | | | | | | | | 828.7 |
| .51 | 7.3 | 34.0 | 87.5 | 87.5 | 80.2 | 53.4 | 70.5 | 34.1 | 21.9 | 7.3 | | | | | | | | | | 493.4 |
| .55 | | 6.1 | 15.3 | 24.4 | 3.0 | 6.1 | 9.2 | 15.3 | 15.3 | | | 3.0 | | | | | | | | 97.7 |
| .80 | | | | | | | | | | | | | | | | | | | | 13.2 |
| 87.35 | 375.0 | 709.1 | 539.1 | 322.3 | 169.9 | 175.8 | 93.8 | 29.3 | 17.6 | | | | | | | | | | | 2431.9 |
| .40 | 592.6 | 301.3 | 54.8 | 42.3 | 10.0 | 19.9 | 5.0 | 2.5 | 2.5 | | | | | | | | | | | 1030.9 |
| .45 | 10.4 | 20.7 | | | | | | 10.4 | | | | | | | | | | | | 41.5 |
| .50 | 12.0 | 30.1 | 6.0 | | 6.0 | 12.0 | 6.0 | 6.0 | 6.0 | | | | | | | | | | | 84.1 |
| .55 | | 6.2 | 12.4 | 6.2 | 12.4 | 18.5 | 24.7 | 49.4 | | 18.6 | | | | | | | | | | 148.4 |
| .60 | | | 14.4 | 43.3 | 14.4 | 14.4 | | | | | | | | | | | | | | 100.9 |
| 90.28 | | | | | 5.0 | 5.0 | 20.1 | 5.0 | 10.0 | 5.0 | 10.0 | | | | | | | | | 60.1 |
| .30 | 9.0 | 29.8 | 9.0 | 12.0 | 41.7 | 47.7 | 32.8 | 26.8 | 20.9 | 9.0 | | | | | | | | | | 241.7 |
| .37 | 8.0 | 2.7 | 2.7 | 8.0 | 13.3 | 13.3 | | 8.0 | 5.3 | | | | | | | | | | | 61.3 |
| .45 | | | | | 33.0 | | | | 33.0 | | | | | | | | | | | 60.0 |
| .50 | | | | | | | | | | | | | | | | | | | | 346.1 |
| .55 | 2.9 | 32.0 | 81.5 | 90.2 | 58.2 | 23.3 | 14.5 | 5.8 | 11.6 | 14.5 | 5.8 | | | | | | | | | 22.4 |
| .60 | | | | | | 11.2 | | | 11.2 | | | | | | | | | | | 13.2 |
| .65 | | | | | | | | | 6.6 | | | | | | 6.6 | | | | | 13.8 |
| 93.27 | 13.5 | 9.1 | | | | | 2.3 | | | | | | | | 13.8 | | | | | 24.9 |
| .30 | 2.2 | | | 2.2 | | | | | | | | | | | | | | | | 4.4 |
| .35 | | | | | | | | | | | | | | | | | | | | 3.1 |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| Cruise 5506 (cont'd): | | | | | | | | | | | | | | | | | | | | |
| 93.40 | | | | 23.7 | 11.8 | 29.7 | 17.7 | 5.9 | | | 5.9 | 5.9 | | | | 5.9 | | | | 106.5 |
| .45 | 98.2 | 109.8 | 17.4 | 11.6 | 28.9 | 69.4 | 46.2 | 23.1 | | | | | | | | | | | | 404.6 |
| .50 | 22.4 | 5.6 | | | | | 5.6 | 5.6 | | | 2.8 | | 2.8 | | 2.8 | | | | | 47.6 |
| 97.30 | 43.0 | 22.7 | 25.3 | 7.6 | 20.2 | 12.7 | 2.5 | 2.5 | | | | | | | | | | | | 136.5 |
| .32 | 8.2 | 8.2 | 2.7 | | | | | | | | | | | | | 5.6 | | | | 19.1 |
| .40 | | | | | | | | | | | | | | | | | | | | 5.6 |
| .45 | | | | | | | | | | | | | | | | | | | 3.1 | 3.1 |
| .50 | | 4.1 | | | | | 4.1 | 16.4 | 12.3 | 4.1 | | | 4.1 | | 4.1 | | 4.1 | | | 53.3 |
| .55 | 30.2 | 5.0 | | | | | | | | | | | | | | | | | | 35.2 |
| 100.30 | 19.6 | 33.7 | 50.6 | 33.8 | 8.4 | 5.6 | 2.8 | | | | | | | | | | | | | 154.5 |
| .35 | | 3.0 | | | 8.9 | 3.0 | | | | | | | | | | | | | | 14.9 |
| .45 | | | | | | 5.9 | | | | | | | | | | | | | | 17.7 |
| .55 | | | | | | | | | | | | | | | | | | | | 2.4 |
| 103.30 | 20.2 | 29.5 | 1.8 | 1.8 | | | | | | | | | 2.4 | | | 11.8 | | | | 53.3 |
| .35 | | | | 2.3 | | | | | | | | | | | | | | | | 2.3 |
| .40 | | | 5.8 | 8.7 | | | | | | | | | | | | | | | | 14.5 |
| 107.40 | | | | | 3.7 | | 1.9 | 1.9 | | | | | | | | | | | | 7.5 |
| .45 | | | | | | | | | 5.6 | 5.6 | | | | | | | | | | 11.2 |
| .50 | | | | 3.2 | 3.2 | 12.8 | 16.0 | 3.2 | 6.4 | | | | | | | | | | | 44.8 |
| 110.35 | | | | | | | | | | | | | | | | | | | 2.1 | 2.1 |
| .45 | | | | | | 2.2 | | | 4.3 | | | | | | | | | | | 6.5 |
| 113.30 | | | | | | | | | | | | | | | 6.2 | 6.2 | | | | 12.4 |
| .75 | | | | 2.9 | | | | | | | | | | | | | | | | 2.9 |
| 117.26 | 1.6 | 1.6 | | 4.8 | 9.6 | 56.0 | 49.6 | 49.6 | 33.6 | 6.4 | 4.8 | 4.8 | 3.2 | | | | | | | 225.6 |
| .30 | 11.6 | 29.1 | 81.5 | 110.6 | 81.5 | 58.2 | 29.1 | 29.1 | 5.8 | 5.8 | 5.8 | | | | | | | | | 424.8 |
| 120.25 | 2.1 | 20.9 | 33.4 | 33.4 | 39.7 | 25.0 | 18.8 | 29.2 | 8.4 | 2.1 | | | | | | | | | | 213.0 |
| .27 | | 4.4 | 4.4 | 4.4 | 8.9 | 4.4 | 8.8 | 40.0 | 8.9 | | | 4.4 | | | | | | | | 88.6 |
| .30 | 4.2 | 8.5 | | | 4.2 | 12.7 | 21.2 | 12.7 | 8.4 | | | | | | | | | | | 84.5 |
| .35 | | | | 3.4 | 10.2 | 20.4 | 15.3 | 18.7 | 3.4 | 3.4 | 3.4 | 1.7 | | 1.7 | | | | | | 81.6 |
| .40 | | | 2.0 | 3.9 | 7.8 | 13.6 | 13.6 | 21.5 | 2.0 | 2.0 | | | | | | | | | | 66.4 |
| .45 | 4.9 | 4.9 | | 4.9 | 4.9 | 4.9 | 19.7 | 10.8 | | 9.9 | | | | | | | | | | 54.1 |
| 127.50 | | | | | | | | | 10.8 | | | | | | | | | | | 21.6 |
| 130.40 | | | | | | | | | | | | | | | | | | | | 3.3 |
| 133.25 | | 6.0 | 24.2 | 114.8 | 157.1 | 138.9 | 42.3 | 24.2 | 6.0 | 6.0 | | | | | | | | | | 519.5 |
| .30 | | 15.9 | | | | 15.9 | 42.2 | 31.7 | | | | | | | | | | | | 105.7 |
| .40 | | 6.6 | | 3.3 | 16.5 | 16.5 | 9.9 | 26.5 | 13.2 | 16.5 | 3.3 | 3.3 | | | | | | | | 118.9 |
| .50 | | | | | | | | 3.1 | 3.1 | | | | | | | | | | | 6.2 |
| 137.23 | | | 36.5 | 218.9 | 291.8 | 255.3 | 291.9 | 218.9 | 109.4 | 73.0 | 36.5 | | | | | | | | | 1568.7 |
| .30 | 2.4 | 9.7 | 118.6 | 370.3 | 554.2 | 254.1 | 94.4 | 53.3 | 29.0 | 4.8 | 7.2 | 2.4 | | | | | | | | 36.5 |
| .40 | | | 37.1 | 68.4 | 17.1 | 31.3 | 34.2 | 17.2 | 5.7 | | | | | | | | | | | 7.3 |
| .50 | | | | | | | | 1.8 | | | | | | | | | | | | 211.0 |
| Total | 1329.9 | 1621.6 | 1436.0 | 1903.8 | 1854.8 | 1554.2 | 1126.4 | 863.1 | 445.8 | 204.8 | 97.0 | 27.9 | 16.3 | 1.7 | 39.1 | 25.5 | | 6.2 | 102.1 | 12656.2 |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

[illegible]

Table IV (Cont'd)
Record of Anchovy Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|-----------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5507 (cont'd): | | | | | | | | | | | | | | | | | | | | |
| 97.45 | | | | | | | | 3.0 | 3.3 | 3.0 | | | | | | | | | | 6.0 |
| .50 | | | | | | | | | | | | | | | | | | | | 3.3 |
| .70 | | | | | | | 3.4 | | | | | | | | | | | | | 20.5 |
| .75 | | | | | | | 5.5 | | | | | 3.4 | 10.3 | | 3.4 | | | | | 5.5 |
| .80 | | | | | | | | | | | | | | | | | 6.1 | | | 6.1 |
| 100.35 | | | | | | | | 2.8 | | | | | | | | | | | | 2.8 |
| .40 | | | | 2.7 | 5.4 | | 2.7 | | 2.3 | 2.3 | 2.3 | | 2.3 | 2.3 | 2.3 | 4.7 | | | | 18.5 |
| 103.40 | | | | | 6.6 | | | | | | | | | | 2.7 | | | | | 13.5 |
| .45 | | | | | | | | 6.6 | | | | | | | | | | | | 19.8 |
| .50 | | | | | | | | | | | | 3.2 | | | 2.9 | | | | | 3.2 |
| 110.33 | | | 2.9 | | | | | | | | | | | | | 3.7 | | | | 5.8 |
| .50 | | | | | | | | | | | | | | | | | | | | 3.7 |
| 113.30 | 5.3 | 10.6 | 5.3 | 5.3 | | | 10.6 | 26.7 | 21.3 | 5.3 | | | | | | | | | | 90.4 |
| .35 | | | 3.2 | | | | 6.4 | | | | | | | | | | | | | 9.6 |
| 117.26 | | 8.8 | 13.2 | | | | 17.6 | 13.2 | 8.8 | 4.4 | | | | | | | | | | 109.8 |
| .30 | | | | 3.3 | 21.9 | 21.9 | 6.6 | 3.3 | | | | | | | | | | | | 79.2 |
| 120.25 | | | | | 46.2 | 19.8 | 6.6 | 3.3 | | | | | | | | | | | | 54.6 |
| .35 | | | | | 4.0 | 4.0 | 16.2 | 14.2 | 12.2 | 2.0 | 2.0 | | | | | | | | | 374.2 |
| .40 | | 14.2 | 14.2 | 28.4 | 90.0 | 104.3 | 94.8 | 14.2 | 4.7 | 4.7 | | | 4.7 | | | | | | | 178.6 |
| .45 | | 5.8 | 34.5 | 57.6 | 40.3 | 28.8 | 5.8 | 5.8 | | | | | | | | | | | | 2.3 |
| .50 | | | | | 2.3 | | | | 6.0 | | | | | | | | | | | 6.0 |
| .70 | | | | | | | | 3.0 | | | | | | | | | | | | 3.0 |
| 123.55 | | | | 5.3 | 5.3 | | | | | | | | | | | | | | | 10.6 |
| 130.30 | | | | | | | | | 2.6 | 2.6 | | | | | | | | | | 5.2 |
| .35 | | 3.8 | 3.8 | | | | | | | | | | | | | | | | | 2.6 |
| .40 | 38.6 | | | | | | | | | | | | | | | | | | | 7.6 |
| 133.25 | | | | 5.1 | 20.4 | 5.1 | | | | | | | | | | | | | | 38.6 |
| .30 | 8.9 | | 8.9 | 6.0 | 3.0 | | | | | | | | | | | | | | | 30.6 |
| 137.23 | | | | 9.1 | | | 27.4 | 61.0 | 9.1 | 15.9 | 10.6 | 9.1 | | | 9.1 | | | | | 26.8 |
| .30 | | 2.6 | 2.6 | 129.8 | 318.0 | 405.5 | 164.4 | | 16.0 | | | 2.6 | | | | | | | | 63.8 |
| Total | 1361.3 | 711.3 | 505.8 | 701.9 | 936.9 | 866.5 | 596.9 | 327.5 | 268.2 | 163.5 | 192.9 | 118.1 | 89.3 | 96.4 | 96.9 | 13.5 | 6.1 | 5.2 | | 7058.2 |

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|-----------------|------|------|-------|------|------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| Cruise 5509: 1/ | 9.6 | | 9.7 | 9.7 | 9.6 | 4.8 | 4.8 | 2.4 | | | | | | | | | | | | |
| 83.42 | 9.6 | | 9.7 | 9.7 | 9.6 | 4.8 | 4.8 | 2.6 | | | | | | | | | | | | 50.6 |
| .44 | | 7.8 | 2.6 | | | 7.8 | 2.6 | | | | | | | | | | | | | 23.4 |
| .46 | | | | | 5.4 | 2.7 | 2.7 | 1.5 | | | | | | | | | | | | 10.8 |
| .48 | | | | | | | | | | | | | | | | | | | | 1.5 |
| .51 | 8.1 | | | | | 2.7 | | | | | | | | | | | | | | 10.8 |
| .55 | 3.0 | | 6.0 | | | | | | | | | | | | | | | | | 9.0 |
| 85.39 | | | | 3.4 | | | | | | | | | | | | | | | | 3.4 |
| .40 | | | 3.1 | | | | | | | | | | | | | | | | | 3.1 |
| 87.35 | | 17.9 | 23.0 | 2.6 | 12.8 | 5.2 | 12.8 | 10.2 | 2.6 | 5.1 | | | | | | | | | | 92.2 |
| .37 | | 2.9 | 2.9 | 2.9 | | | | 4.7 | | | | | | | | | | | | 8.7 |
| .40 | | | | | 2.3 | 11.7 | 9.3 | | | | | | | | | | | | | 28.0 |
| .42 | | | | | | 2.7 | | | | | | | | | | | | | | 2.7 |
| .45 | | | | | | 5.4 | | | | | | | | | | | | | | 5.4 |
| .52 | | | | | 2.5 | | 2.5 | | | | | | | | | | | | | 5.0 |
| 90.28 | 3.6 | 17.8 | 10.7 | 7.1 | 7.2 | 7.2 | 14.3 | 3.6 | 3.6 | 2.5 | 3.6 | | | | | | | | | 78.7 |
| .30 | | 7.6 | 12.6 | 7.6 | 2.5 | 12.6 | 12.7 | 10.2 | | | | | | | | | | | | 68.3 |
| .35 | | 6.8 | 6.8 | | | | 3.4 | | | | | | | | | | | | | 27.2 |
| .37 | 10.2 | 6.2 | 39.8 | 45.9 | 33.6 | 12.2 | 6.1 | 3.1 | | | | | | | | | | | | 146.9 |
| .40 | | | 2.7 | 8.0 | 8.0 | 8.0 | 2.7 | 2.7 | | | | | | | | | | | | 34.8 |
| .42 | | | | | 2.8 | 2.8 | 5.6 | 16.8 | 2.8 | 5.6 | 2.8 | | 2.8 | | | | | | | 42.0 |
| .45 | | | | | | | 23.2 | 5.8 | | 5.8 | 11.6 | | | | | | | | | 46.4 |
| .47 | | | | | | | 5.9 | 3.0 | 8.9 | | | 3.0 | | | | | | | | 20.8 |
| Total | 34.5 | 67.0 | 119.9 | 87.2 | 86.7 | 85.8 | 108.6 | 61.1 | 26.1 | 19.0 | 18.0 | 3.0 | 2.8 | | | | | | | 719.7 |

1/ First occupancy of "Black Douglas" used.

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|--------------|------|------|------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| Cruise 5510: | | | | | | | | | | | | | | | | | | | | |
| 60.80 | 5.8 | | | | | 2.2 | | | 2.2 | | | | | | | | | | | 5.8 |
| 63.52 | | | | | | 5.9 | | | | | | | | | | | | | | 4.4 |
| 77.55 | | | | | | | | | | | | | | | | | | | | 5.9 |
| 83.43 | | | | | | | | | | | | | | | | | | | | 2.8 |
| 87.40 | | | | | 2.8 | | 2.8 | | 2.8 | | | | | | | | | | | 19.6 |
| .50 | | | | 4.2 | | | 6.3 | | | | | | | | | | | | | 5.6 |
| .60 | | | | | 2.5 | | | | | | | | | | | | | | | 10.5 |
| 90.28 | | | | 7.9 | | 13.2 | 7.9 | | 2.6 | | | | | | | | | | | 2.5 |
| .30 | | | 2.5 | 12.4 | 12.4 | 14.8 | 10.0 | 5.0 | | | 2.5 | | | | | | | | | 36.9 |
| .37 | | | | | 2.5 | | | | | | | | | | | | | | | 59.6 |
| 93.27 | | 2.5 | | | | 2.5 | | | | | | | | | | | | | | 2.5 |
| .30 | | | | | | 2.9 | | | | | | | | | | | | | | 5.0 |
| 97.30 | | | | | | | | | 2.5 | 2.5 | | | | | | | | | | 2.9 |
| .50 | 2.7 | | | | | | | | | | | | | | | | | | | 2.7 |
| 100.29 | | 4.6 | | | | 4.6 | | 4.6 | | | | | | 4.6 | | | | | | 18.4 |
| .30 | | | | 3.2 | | 3.2 | | 3.2 | | | | | | | | | | | | 9.6 |
| 103.30 | | | | | | | | 4.0 | | 4.0 | | | | | | | | | | 52.3 |
| .35 | | | | | | | | 8.5 | 5.6 | 8.5 | 4.0 | 12.1 | 16.2 | 4.0 | 4.0 | 4.0 | | | | 34.0 |
| .40 | | | | | | | | 6.6 | 3.3 | 3.3 | | 11.4 | | | | | | | | 13.2 |
| 107.35 | | | | | | 1.9 | | | | | | | | | | | | | | 1.9 |
| 110.60 | | | | | | | | | 3.0 | | | | | | | | | | | 3.0 |
| 113.30 | 19.3 | 38.7 | 38.6 | | 9.7 | | | | | 3.7 | | | | 11.1 | 11.1 | 3.7 | 3.7 | 3.7* | | 106.3 |
| .35 | | | | 4.8 | 4.8 | | 3.7 | 3.7 | | | | | | | | | | | | 44.4 |
| 117.30 | 4.8 | | | | 4.8 | | 4.8 | | | | | | | | | | | | | 19.2 |
| .35 | | | 13.4 | 13.5 | 26.9 | 13.4 | 13.4 | | | | | | | | | 6.7 | | | | 87.3 |
| .40 | | | | | 3.3 | 6.6 | | | | | | | | | | | | | | 9.9 |
| 120.27 | | | | | 2.4 | | 2.4 | | | | | | | | | | | | | 4.8 |
| .30 | | | | 4.0 | 4.0 | | | | | | | | | | | | | | | 8.0 |
| .35 | | | 2.1 | 4.2 | 2.1 | | | | | | | | | | | | | | | 8.4 |
| .45 | | | 2.4 | 9.4 | | 2.4 | 2.4 | | | | | | | | | | | | | 16.6 |
| .50 | | | | | | | | | 3.5 | | | | | | | | | | | 3.5 |
| .80 | | | | | | | | | | | | | 2.5 | | | | | | | 2.5 |
| 123.40 | | | | | | | | | | 4.4 | | | | | 4.4 | | | | | 8.8 |
| .50 | | | | 5.9 | | | | | | | | | | | | | | | | 8.9 |
| 127.34 | | | | | 2.2 | | | | | 2.2 | | | | | | | | | | 8.8 |
| .50 | | | | | | | | | | | | | | | | | | | | 2.8 |
| 137.30 | | | | | | | | | | | 2.9 | | | | | | | | | 2.9 |
| Total | 8.5 | 31.2 | 59.1 | 108.1 | 78.4 | 83.8 | 46.9 | 61.7 | 25.5 | 31.4 | 9.4 | 23.5 | 18.7 | 19.7 | 19.5 | 14.4 | 3.7 | 3.7 | | 647.2 |

* - 3.7 - 25.5 mm. group.

Table IV (Cont'd)
Record of Anchovy Larvae, 1955

Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|----------------|------|-------|-------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5511:1/ | | | | | | | | | | | | | | | | | | | | |
| 83.40 | | 1.7 | | | | | | | | 3.0 | | | | | | | | | | 1.7 |
| .42 | 13.7 | 9.1 | 4.5 | 3.0 | | | | | | | | | | | | | | | | 33.3 |
| .44 | | 1.8 | | | 1.8 | | | | | | | | | | | | | | | 3.6 |
| .51 | | | | | | | 2.8 | | | | | | | | | | | | | 8.4 |
| .52 | | | 9.2 | | | | 4.6 | | | | | | | | | | | | 2.8* | 18.4 |
| .55 | | | | | | | | | | 4.9 | | | | | | | 4.6 | | | 4.9 |
| 85.39 | | 2.7 | 2.7 | 8.1 | | | | | | | | | | | | | | | | 13.5 |
| .40 | | | | 2.6 | | | | | | | | | | | | | | | | 2.6 |
| .42 | | | | 2.4 | | | | | | | | | | | | | | | | 2.4 |
| .45 | | | | 2.6 | | | | | | | | | | | | | | | | 5.2 |
| 87.35 | | 2.5 | 17.5 | 17.4 | 5.0 | | 2.6 | | | | | | | | | | | | | 49.9 |
| .37 | | 2.4 | 4.8 | | | | 7.5 | | | | | | | | | | | | | 7.2 |
| .42 | | | | 5.1 | | | | | | | | | | | | | | | | 5.1 |
| .45 | | | 12.0 | 9.6 | | | 2.4 | | | | | | | | | | | | | 31.2 |
| .50 | | | 2.2 | 10.9 | | | | | | | | | | | | | | | | 13.1 |
| .52 | | | 2.1 | 2.1 | | | | | | | | | | | | | | | | 4.2 |
| .55 | | | | 2.6 | | | | | | | | | | | | | | | | 2.6 |
| 90.28 | 73.1 | 273.5 | 50.8 | 35.0 | 35.0 | 12.7 | | | | | 3.2 | | | | | | | | | 483.3 |
| .30 | | | | | 2.6 | | | | | | | | | | | | | | | 2.6 |
| .35 | | | | | | | | | | 2.7 | | | | | | | | | | 2.7 |
| .37 | | | | | | | | | | | | | | | | | | | | 87.0 |
| .40 | | 8.8 | 12.4 | 12.4 | 20.7 | 22.8 | 10.3 | 2.1 | 2.1 | | 4.2 | | | | | | | | | 141.9 |
| .42 | | | 17.7 | 26.6 | 17.8 | 48.8 | 17.8 | 4.4 | | | | | | | | | | | | 122.8 |
| .45 | | | | 42.4 | 50.9 | 16.9 | | | 4.2 | 8.4 | | | | | | | | | | 97.0 |
| .47 | | | 2.2 | 30.1 | 21.5 | 19.4 | 2.2 | 8.6 | 6.5 | 6.5 | | | | | | | | | | 8.1 |
| .50 | | | | 2.7 | 2.7 | | | | 2.7 | | | | | | | | | | | 2.6 |
| Total | 86.8 | 302.5 | 138.1 | 215.6 | 165.2 | 138.1 | 35.5 | 15.1 | 18.1 | 25.5 | 7.4 | | | | | 4.6 | 2.8 | | | 1155.3 |

1/ First occupancy of "Paolina T" used.

* - 2.8 - 25.5 mm. group.

Table IV (Cont'd)
Record of Anchovy Larvae, 1955
Midpoint of Size Class (in mm.)

| Station | 2.50 | 3.75 | 4.75 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.75 | 17.25 | 19.25 | 21.25 | 23.25 | Dis. | Total |
|--------------|-------|------|------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| Cruise 5512: | | | | | | | | | | | | | | | | | | | | |
| 80.55 | | | | 1.1 | 3.4 | 3.3 | 2.9 | 2.9 | 2.9 | 2.7 | | | | | | | | | | 5.8 |
| 83.40 | | | | | 5.4 | | 2.2 | 1.1 | 1.1 | 3.4 | | | | | | | | | | 11.1 |
| .43 | | | | | | | | | | | | | | | | | | | | 8.1 |
| .51 | | 6.8 | | | | | | | | | | | | | | | | | | 10.2 |
| .60 | | | | | | | | | | | | | | | | | | | | 2.9 |
| 87.35 | | | | | 2.4 | 4.8 | 4.7 | 7.1 | 14.2 | 2.4 | 2.9 | | | | | | | | | 40.3 |
| .40 | 4.5 | | | 2.2 | 4.5 | 4.4 | 2.2 | 9.0 | 4.5 | | 4.7 | | | | | | | | | 35.7 |
| .50 | 3.1 | 3.1 | | | | | | | 3.1 | | 2.2 | | 2.2 | | | | | | | 9.3 |
| 90.28 | | | | | 2.4 | | 4.9 | 4.8 | | | | | | | | | | | | 12.1 |
| .30 | | | 7.8 | 2.4 | | 4.8 | 7.2 | | | | 2.4 | | | | | | | | | 16.8 |
| .37 | | | | | | | | | | | 2.6 | | | | | | | | | 13.0 |
| .45 | | 3.0 | | 3.0 | 3.0 | 3.0 | | 6.0 | | | | | | | | | | | | 18.0 |
| 93.27 | | | | | | 5.2 | | | | | | | | | | | | | | 5.2 |
| .40 | 4.5 | | | | | 4.5 | | | | 4.5 | 4.5 | | | 4.5 | | | | | | 22.5 |
| 97.32 | | | | | | 3.1 | | | | | | | | | | | | | | 3.1 |
| 100.29 | | | | | | 5.6 | | 11.2 | | | | | | | | | | | | 16.8 |
| .30 | | | | 5.4 | | | | | | | | | | | | | | | | 5.4 |
| 110.33 | | 4.6 | | | | 4.6 | | | | | | | | | | | | | | 46.3 |
| .40 | | | | | 3.7 | | | | 9.2 | 9.3 | 18.6 | | | | | | | | | 3.7 |
| 113.30 | | | | 9.8 | 9.8 | 19.6 | 44.1 | 83.3 | 49.0 | 19.6 | | | | | | | | | | 274.4 |
| .35 | 19.1 | 29.7 | 14.9 | 4.2 | | | 4.2 | | 2.1 | 6.4 | 2.1 | 2.1 | 19.6 | 9.8 | 4.9 | 4.9 | | | | 86.9 |
| .60 | | | | | | 2.6 | | | | 2.6 | | | | | 2.1 | 2.1 | | | | 5.2 |
| 117.30 | | 2.9 | 8.8 | 29.4 | 5.8 | | | 5.8 | | | | | | | | | | | | 52.7 |
| .35 | 6.4 | 9.6 | 3.2 | 3.2 | | | | | | | | | | | | | | | | 22.4 |
| .40 | | 3.0 | | 3.0 | 15.0 | 6.0 | | 6.0 | 3.0 | | | | | | | | | | | 36.0 |
| .50 | 7.9 | | 2.6 | 7.9 | 2.6 | 2.6 | | | | | | | | | | | | | | 23.6 |
| 120.25 | | 2.4 | | | | | 2.4 | | | | | | | | | | | | | 9.6 |
| .30 | | 5.4 | | 5.4 | 16.2 | 5.4 | 5.4 | | 2.4 | 2.4 | | | | | | | | | | 37.8 |
| .35 | | | | 5.1 | | 5.1 | 10.2 | 25.3 | 10.2 | 10.1 | | | | | | | | | | 71.1 |
| 130.30 | 74.5 | 5.3 | | | | | | | | | | | | | | | | | | 79.8 |
| .35 | | 8.8 | 17.6 | 20.5 | 8.8 | | | | | | | | | | | | | | | 55.7 |
| .40 | | | | | | 2.8 | | | | | | | | | | | | | | 2.8 |
| 133.25 | | | | | | | | | | | | | | | | | | | | 15.6 |
| 137.23 | 15.6 | | | 2.9 | | | | | | | | | | | | | | | | 2.9 |
| 140.30 | 2.8 | | | 5.6 | 8.4 | 2.8 | | | | | | | | | | | | | | 19.6 |
| 143.35 | | | 3.2 | | | | | | | | | | | | | | | | | 3.2 |
| Total | 139.4 | 84.6 | 63.2 | 111.1 | 91.4 | 90.2 | 90.4 | 158.5 | 104.3 | 63.4 | 37.6 | 4.5 | 21.8 | 14.3 | 7.0 | 4.9 | | | | 1065.6 |

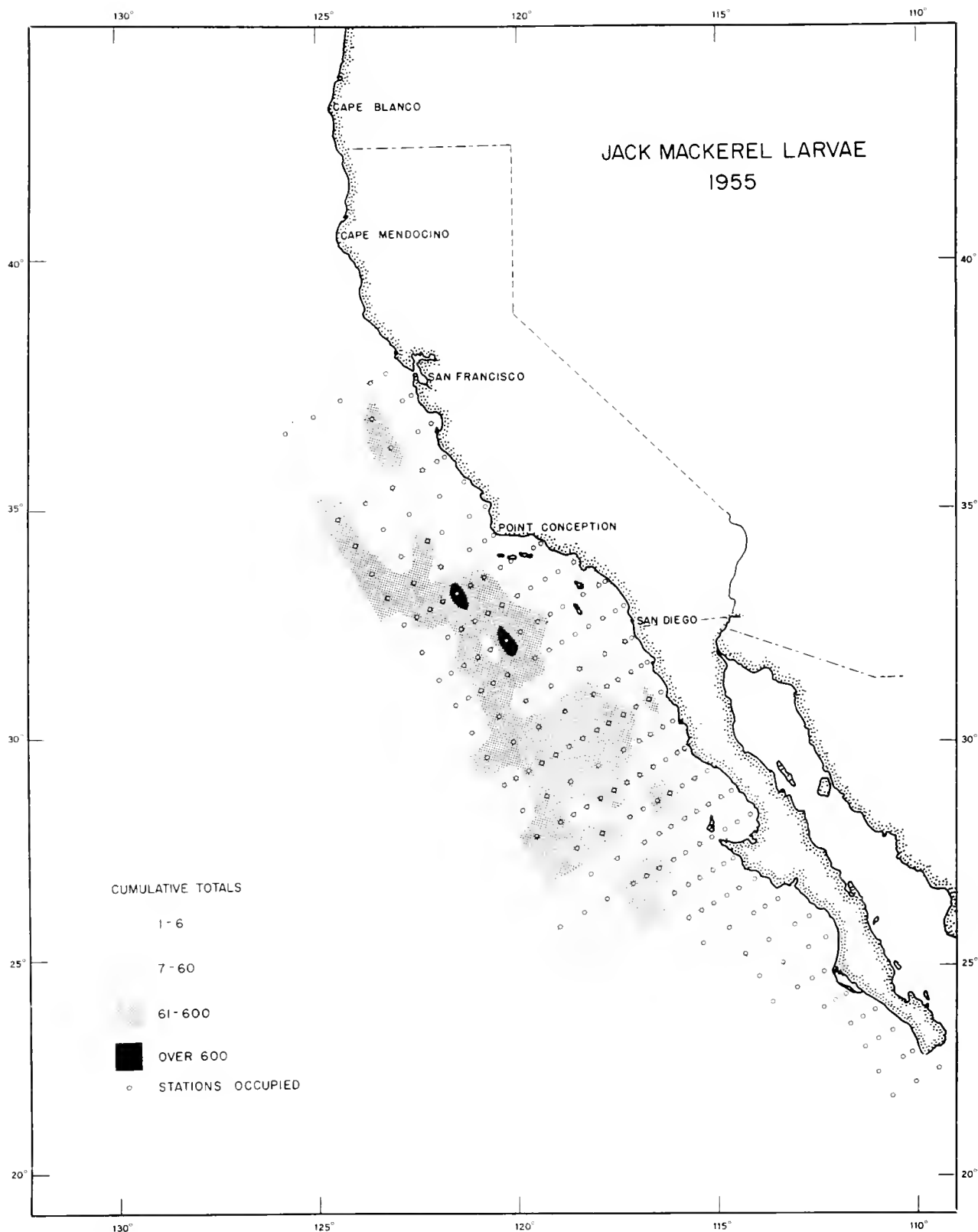


Figure 5.--Jack mackerel larvae, 1955: distribution and relative abundance.

RECORD OF THE LARVAE OF THE JACK MACKEREL
(TRACHURUS SYMMETRICUS), 1955

The distribution and relative abundance of jack mackerel larvae are shown in figure 5. The categories of abundance are identical to those already described for sardine larvae; individual station values represent the cumulative standard haul total for the year.

The larvae are recorded by size classes in table V. They have the following midpoints and ranges:

| Midpoint (in mm.) | Range (in mm.) | Midpoint (in mm.) | Range (in mm.) |
|----------------------|-------------------|----------------------|-------------------|
| 2.00 | 1.76-2.25 | 7.75 | 7.26-8.25 |
| 2.50 | 2.26-2.75 | 8.75 | 8.26-9.25 |
| 3.00 | 2.76-3.25 | 9.75 | 9.26-10.25 |
| 3.50 | 3.26-3.75 | 10.75 | 10.26-11.25 |
| 4.00 | 3.76-4.25 | 11.75 | 11.26-12.25 |
| 4.50 | 4.26-4.75 | 12.75 | 12.26-13.25 |
| 5.00 | 4.76-5.25 | 13.75 | 13.26-14.25 |
| 5.75 | 5.26-6.25 | 14.75 | 14.26-15.25 |
| 6.75 | 6.26-7.25 | 15.26 and over | |

The data are summarized in text table 6 by month and area. There were no occurrences of jack mackerel larvae off southern Baja California, and only 1.7% of the larvae was taken off lower central Baja California. The greatest abundance occurred off southern California (43.2% of total), and the next highest abundance was in the adjoining area to the south.

Latitudinal changes in distribution month by month were more marked than in previous years (cf. Ahlstrom and Ball 1954, tables 7 and 8). No larvae were obtained during January. In February, most larvae were taken in the area off Cedros Island (lines 110-120). Larvae were moderately abundant during a five-month period in this area, with the peak occurring in April. The peak also occurred in April off northern Baja California. Larvae were uncommon off southern California until May, and a marked peak occurred in June. No larvae were obtained off central California in May, but fair numbers were taken in June and July. There was only one occurrence after July on the regular survey cruises.

The interesting distribution found on "Norpac" (cruise 5508) has been commented upon by Ahlstrom (1956: 39, fig. 19): jack mackerel eggs and larvae were taken as far north as Washington, and as far offshore as 150° W. longitude (over 1000 miles offshore). The egg and larval collections taken by Pacific Oceanic Fishery Investigations (POFI) on "Norpac" have been examined subsequently to determine if jack mackerel eggs and larvae occurred in the area between 155°-180° W. longitude, and 40°-50° N. latitude. None were found.

Text table 6.--Occurrence and abundance (standard haul totals) of jack mackerel larvae (Trachurus symmetricus), by month and area, in hauls made during 1955

| Cruise | Central California 60-77 | | Southern California 80-93 | | Northern Baja California 97-107 | | Upper central Baja California 110-120 | | Lower central Baja California 123-137 | | Southern California 140-157 | | Total | |
|---------|--------------------------|------|---------------------------|-------|---------------------------------|-------|---------------------------------------|-------|---------------------------------------|------|-----------------------------|------|--------|--------|
| | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- |
| | rences | ber | rences | ber | rences | ber | rences | ber | rences | ber | rences | ber | rences | ber |
| 5501 | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5502 | - | - | 0 | 0 | 4 | 27 | 13 | 544 | 3 | 48 | 0 | 0 | 20 | 619 |
| 5503 | - | - | 2 | 6 | 12 | 857 | 12 | 202 | 3 | 10 | 0 | 0 | 29 | 1,075 |
| 5504 | - | - | 7 | 22 | 36 | 2,446 | 34 | 892 | 5 | 35 | - | - | 82 | 3,395 |
| 5505 | 0 | 0 | 15 | 120 | 32 | 444 | 24 | 468 | 3 | 31 | - | - | 74 | 1,063 |
| 5506 | 9 | 276 | 31 | 4,529 | 21 | 292 | 25 | 266 | 4 | 23 | - | - | 90 | 5,386 |
| 5507 | 13 | 384 | 28 | 1,039 | 12 | 124 | 13 | 85 | 7 | 74 | - | - | 73 | 1,706 |
| 5508 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5509 | - | - | 0 | 0 | - | - | - | - | - | - | - | - | 0 | 0 |
| 5510 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | - | - | 1 | 2 |
| 5511 | - | - | 0 | 0 | - | - | - | - | - | - | - | - | 0 | 0 |
| 5512 | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 22 | 660 | 83 | 5,716 | 118 | 4,192 | 121 | 2,457 | 25 | 221 | 0 | 0 | 369 | 13,246 |
| Percent | | | 5.0 | 43.2 | | 31.6 | | 18.5 | | 1.7 | | 0 | | 100.0 |

Table V
Record of the Larvae of Jack Mackerel (*Trachurus symmetricus*), 1955

Midpoint of Size Class (in mm.)

| Station | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.26 and over | Total |
|--------------|------|-------|-------|-------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|----------------------|-------|
| Cruise 5502: | | | | | | | | | | | | | | | | | | | |
| 100.70 | 10.4 | 3.4 | | | | | | | | | | | | | | | | | 13.8 |
| .80 | 2.9 | | | | | | | | | | | | | | | | | | 2.9 |
| 107.40 | | | 3.3 | | | | | | | | | | | | | | | | 3.3 |
| .50 | | 3.3 | 3.3 | | | | | | | | | | | | | | | | 6.6 |
| 110.80 | 47.0 | 63.8 | 70.6 | 87.4 | 33.6 | | | | | | | | | | | | | | 302.4 |
| 113.60 | | | 6.7 | 3.4 | | 10.0 | | | | | | | | | | | | | 20.1 |
| .70 | 27.5 | 24.5 | 6.1 | | 3.1 | | | | | | | | | | | | | | 61.2 |
| 117.60 | | | 10.0 | 3.3 | 13.3 | | 3.3 | 3.3 | | | | | | | | | | | 33.2 |
| .70 | | 7.3 | | | 3.7 | 3.7 | 3.7 | | | | | | | | | | | | 18.4 |
| 120.45 | | | | | 3.6 | 2.2 | 2.2 | | | | | | | | | | | | 4.4 |
| .50 | | | | | 3.6 | | | | | | | | | | | | | | 3.6 |
| .55 | | | | 7.3 | 3.6 | | | | | | | | | | | | | | 10.9 |
| .60 | | 5.4 | 13.5 | 5.4 | | 8.1 | 5.4 | 8.1 | 2.7 | | | | | | | | | | 48.6 |
| .70 | | 3.1 | | | | | | | | | | | | | | | | | 3.1 |
| .80 | | 7.1 | 4.7 | | 4.7 | | | | | | | | | | | | | | 16.5 |
| .90 | | 4.4 | 6.7 | | 2.2 | | | | | | | | | | | | | | 13.3 |
| .100 | | | 5.6 | 2.8 | | | | | | | | | | | | | | | 8.4 |
| 123.45 | | 4.0 | 7.9 | 5.9 | 9.9 | 5.9 | 3.2 | 2.0 | | | | | | | | | | | 3.2 |
| .55 | | | | | | 2.8 | 5.9 | | | | | | | | | | | | 41.5 |
| 127.50 | | | | | | | | | | | | | | | | | | | 2.8 |
| Total | 87.8 | 126.3 | 138.4 | 115.5 | 77.7 | 32.7 | 23.7 | 13.4 | 2.7 | | | | | | | | | | 618.2 |
| Cruise 5503: | | | | | | | | | | | | | | | | | | | |
| 93.40 | | | | 2.7 | | | | | | | | | | | | | | | 2.7 |
| .70 | | | | | | | | | 3.4 | | | | | | | | | | 3.4 |
| 97.50 | 6.9 | 2.3 | | | | | | | | | | | | | | | | | 9.2 |
| .60 | | 2.6 | | 2.6 | | | | | | | | | | | | | | | 5.2 |
| 100.50 | | | | 3.0 | | 3.0 | | | | | | | | | | | | | 6.0 |
| .60 | | | 3.4 | | | | | | | | | | | | | | | | 3.4 |
| .70 | 26.1 | 14.5 | 17.4 | 2.9 | 2.9 | 2.9 | | | | | | | | | | | | | 66.7 |
| .80 | 31.1 | 45.0 | 20.8 | 10.4 | 10.4 | 6.9 | 3.5 | | | | | | | | | | | | 128.1 |
| .90 | 68.0 | 98.6 | 129.2 | 57.8 | 10.2 | 10.2 | 3.4 | | | | | | | | | | | | 377.4 |
| 103.50 | | | 3.4 | | | 6.7 | 3.4 | | | | | | | | | | | | 16.9 |
| .70 | 31.7 | 43.9 | 24.4 | 22.0 | 2.4 | | 2.4 | | 3.4 | | | | | | | | | | 126.8 |
| 107.50 | | | 17.4 | | 3.5 | 3.5 | 3.5 | | | | | | | | | | | | 27.9 |
| .60 | | 3.2 | 6.4 | 6.4 | 9.6 | 9.6 | 6.4 | | | | | | | | | | | | 41.6 |
| .70 | | 5.3 | 18.6 | 10.6 | 5.3 | 2.6 | 2.6 | | 2.6 | | | | | | | | | | 47.6 |
| 110.50 | | | 8.4 | | 2.8 | | | | | | | | | | | | | | 22.4 |
| .60 | 3.4 | 3.3 | | 3.4 | | 3.4 | | | | | | | | | | | | | 10.2 |
| .70 | | | | | | | | | | | | | | | | | | | 3.3 |
| .80 | | | 20.6 | 14.8 | 5.9 | 3.0 | 3.0 | | | | | | | | | | | | 47.3 |

Table V (Cont'd)
Record of the Larvae of Jack Mackerel (*Trachurus symmetricus*), 1955

| Station | Midpoint of Size Class (in mm.) | | | | | | | | | | | | | | Total 15.26 and over | | |
|-----------------------|---------------------------------|-------|-------|-------|------|------|------|------|------|------|------|------|-------|-------|-------------------------------|-------|--------|
| | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | | 12.75 | 13.75 |
| Cruise 5503 (cont'd): | | | | | | | | | | | | | | | | | |
| 110.90 | | | 6.9 | 13.8 | 6.9 | | | 10.4 | | | | | | | | | 38.0 |
| 117.45 | | | | | 3.2 | | | | | | | | | | | | 3.2 |
| .50 | | | | | 3.1 | 3.1 | | | | | | | | | | | 6.2 |
| .70 | | | | | 3.2 | | | | | | | | | | | | 3.2 |
| 120.55 | 6.1 | | | | | | | | | | | | | | | | 6.1 |
| .70 | 8.9 | 20.9 | 8.9 | | | | | | | | | | | | | | 38.7 |
| .90 | | | 6.4 | | | | | | | | | | | | | | 6.4 |
| .100 | 5.6 | | 2.8 | 8.5 | 1.8 | | | | | | | | | | | | 16.9 |
| 123.50 | | | | | | | | | | | | | | | | | 1.8 |
| 127.60 | | | | | | | | | | | | | | | | | 5.6 |
| 133.50 | | 2.7 | | | | 5.6 | | | | | | | | | | | 2.7 |
| Total | 187.8 | 242.3 | 295.0 | 170.1 | 71.2 | 60.5 | 25.8 | 12.8 | 9.4 | | | | | | | | 1074.9 |
| Cruise 5504: | | | | | | | | | | | | | | | | | |
| 83.80 | | | | | | | 3.0 | | | | | | | | | | 3.0 |
| 87.35 | | | 2.8 | | | | | | | | | | | | | | 2.8 |
| .60 | 2.7 | | | | | | | | | | | | | | | | 2.7 |
| 93.60 | | | 2.8 | 2.8 | | | | | | | | | | | | | 5.6 |
| .70 | | 2.4 | | | | | 2.8 | | | | | | | | | | 2.4 |
| .80 | | | | | | | | | | | | | | | | | 2.8 |
| .90 | | | | 2.8 | | | | | | | | | | | | | 2.8 |
| 97.32 | | | 3.1 | | | | | | | | | | | | | | 3.1 |
| .40 | | | 5.0 | | | 2.5 | 2.5 | 2.5 | | | | | | | | | 12.5 |
| .50 | | | | 2.7 | | | | | | | | | | | | | 2.7 |
| .60 | | 3.0 | | | 3.0 | | 3.0 | 3.0 | | | | | | | | | 12.0 |
| .70 | | | 6.4 | 12.8 | | | 6.4 | 12.8 | | | | | | | | | 38.4 |
| .80 | 8.6 | 5.7 | 17.1 | 14.2 | 14.2 | 8.6 | | | | | | | | | | | 68.4 |
| .90 | | | | | | | | 4.8 | | | | | | | | | 4.8 |
| 100.30 | | | | | 2.5 | | 2.5 | | | | | | | | | | 5.0 |
| .50 | | | | 6.3 | 3.2 | 9.4 | | 9.5 | 6.4 | | | | | | | | 34.8 |
| .60 | 2.9 | 2.9 | 2.9 | 17.3 | 14.4 | 2.9 | 5.8 | 2.9 | | | | | | | | | 52.0 |
| .70 | 2.9 | 2.9 | | 2.9 | 5.7 | 5.7 | | 5.7 | | | | | | | | | 25.8 |
| C100.80 | 2.8 | 5.5 | 22.0 | 11.0 | 5.5 | 2.8 | 2.8 | | | | | | | | | | 52.4 |
| .90 | 3.6 | | 7.3 | 14.6 | 7.3 | 3.6 | 11.0 | | | | | | | | | | 47.4 |
| B103.35 | 7.1 | 19.0 | 14.2 | 4.7 | 7.1 | 4.7 | 9.5 | 11.9 | 2.4 | | | | | | | | 80.6 |
| H .35 | 3.7 | | 7.4 | | 3.7 | | 11.1 | 25.9 | 7.4 | 3.7 | | | | | | | 62.9 |
| B .40 | | | 2.0 | 10.1 | 6.1 | 8.1 | 8.1 | 6.1 | | | | | | | | | 40.5 |
| H .40 | | | | 8.8 | 17.6 | 17.6 | 8.8 | 11.8 | | | | | | | | | 64.6 |
| B .45 | | 2.6 | 13.0 | 18.2 | 36.4 | 20.8 | 18.2 | 18.2 | 5.2 | | | | | | | | 132.6 |
| B .50 | | | 5.2 | 5.2 | 2.6 | 10.3 | 15.5 | 10.3 | | | | | | | | | 49.1 |
| C .50 | 2.8 | | | | | | 2.8 | | 2.8 | | | | | | | | 8.4 |

Table V (Cont'd)
Record of the Larvae of Jack Mackerel (*Trachurus symmetricus*), 1955

| Station | Midpoint of Size Class (in mm.) | | | | | | | | | | | | | | | | | 15.26 and over | Dis. | Total |
|-----------------------|---------------------------------|------|------|-------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|----------------------|------|-------|
| | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | | | |
| Cruise 5504 (cont'd): | | | | | | | | | | | | | | | | | | | | |
| B103.55 | 3.0 | | 3.0 | 6.6 | 3.0 | 6.0 | 6.0 | 12.0 | | 3.0 | | | | | | | | 42.0 | | |
| B .60 | | | 7.9 | 5.3 | 10.6 | 5.3 | 5.3 | | | | | | | | | | | 34.4 | | |
| C .60 | 5.6 | 2.8 | 11.2 | 11.2 | 14.0 | 14.0 | 8.4 | 19.6 | 2.8 | 2.8 | | | | | | | | 92.4 | | |
| B .65 | 11.0 | 16.5 | 16.5 | 88.0 | 33.0 | 5.5 | 11.0 | | 11.0 | 5.5 | | | | | | | | 198.0 | | |
| B .70 | | 2.9 | 14.6 | 40.9 | 35.0 | 14.6 | 35.0 | 35.0 | 5.8 | | | | | | | | | 183.8 | | |
| C .70 | 5.1 | 7.7 | 5.1 | 18.0 | 28.3 | 15.4 | 7.7 | 2.6 | 5.1 | | | | | | | | | 95.0 | | |
| B .75 | 5.6 | 11.3 | 31.0 | 33.8 | 28.2 | 25.4 | 5.6 | 14.1 | | | | | | | | | | 157.8 | | |
| B .80 | 2.5 | 10.1 | 37.8 | 110.9 | 88.2 | 68.0 | 15.1 | 30.2 | 2.5 | 2.5 | | | | | | | | 367.8 | | |
| C .80 | | 3.4 | 6.7 | 10.1 | 3.4 | 6.7 | 3.4 | 6.7 | 16.8 | | | | | | | | | 57.2 | | |
| H107.35 | | | | | | | | | | | | | | | | | | | | |
| H .40 | 10.8 | | 4.2 | | 16.9 | 4.2 | 8.5 | 4.2 | | | | | | | | | | 10.8 | | |
| H .50 | | | 3.2 | 19.0 | 41.2 | 47.6 | 41.2 | 25.3 | | | | | | | | | | 38.0 | | |
| H .60 | | 2.4 | 9.6 | 21.5 | 12.0 | 14.3 | 16.7 | 21.5 | 7.2 | 2.4 | | | | | | | | 177.5 | | |
| H .70 | 2.9 | | 2.9 | | 8.7 | | 2.9 | 11.6 | 14.5 | | | | | | | | | 107.6 | | |
| B .80 | 2.5 | 4.9 | 2.5 | 2.5 | 4.9 | | 2.5 | 4.9 | | 2.5 | 2.5 | | | | | | | 43.5 | | |
| H .80 | | | | | 4.9 | 3.1 | 3.1 | 6.2 | 3.1 | 3.1 | | | | | | | | 27.2 | | |
| H110.33 | 3.1 | 3.1 | 2.0 | | | | 4.0 | 6.0 | 2.0 | 3.1 | | | | | | | | 15.5 | | |
| H .35 | | | | | | | 2.5 | 2.5 | | 2.0 | | | | | | | | 9.3 | | |
| H .60 | | | | | | | 2.5 | 2.5 | | 2.0 | | | | | | | | 16.0 | | |
| B .60 | | | | 14.2 | 42.7 | 35.6 | 24.9 | 10.7 | 14.3 | | | | | | | | | 5.0 | | |
| H .70 | | | 2.6 | 2.6 | 2.6 | | 2.6 | 2.6 | 2.6 | | | | | | | | | 142.4 | | |
| H .80 | | | | 2.3 | 2.3 | 2.3 | 2.3 | 4.6 | 2.3 | | | | | | | | | 13.0 | | |
| B .80 | 2.4 | | 7.2 | | 2.4 | 2.4 | 2.4 | 2.4 | | | | | | | | | | 13.8 | | |
| H .90 | | | | 9.2 | 6.1 | 15.3 | 6.1 | 6.2 | | | | | | | | | | 16.8 | | |
| H113.45 | | 3.0 | 9.1 | 3.0 | 12.2 | 9.1 | 12.2 | 6.1 | 3.0 | 6.1 | | | | | | | | 42.9 | | |
| H .50 | | | 3.2 | 12.8 | 9.6 | 9.6 | 12.8 | 16.0 | 3.2 | | | | | | | | | 63.8 | | |
| H .55 | | | | | | 2.9 | 8.6 | | | | | | | | | | | 67.2 | | |
| H .60 | | | | | 2.7 | 16.3 | 16.3 | 16.3 | 3.2 | | | | | | | | | 11.5 | | |
| B .60 | | | | 2.8 | | 2.8 | | 5.6 | 2.8 | 2.8 | | | | | | | | 51.6 | | |
| H .70 | | | | 10.9 | | | | | | | | | | | | | | 16.8 | | |
| B .80 | | 3.6 | 7.3 | 2.8 | 11.0 | | | | 2.8 | | | | | | | | | 21.8 | | |
| H117.30 | | 2.8 | 2.8 | 2.8 | | | 10.2 | | | | | | | | | | | 22.2 | | |
| H .35 | | | | | | | | | | | | | | | | | | 10.2 | | |
| H .40 | | | | | | | | | 6.4 | | | | | | | | | 6.4 | | |
| H .45 | 3.1 | | 3.6 | 3.1 | 3.6 | | | 6.2 | 7.9 | | | | | | | | | 7.9 | | |
| H .50 | | | 3.6 | 3.6 | 5.7 | | | | 9.2 | 9.2 | | | | | | | | 30.8 | | |
| H .55 | | | | | | | | | 3.6 | | | | | | | | | 18.0 | | |
| H .60 | | 2.9 | | 2.9 | | | | | | | | | | | | | | 5.7 | | |
| B .60 | | | 11.0 | | | | | | | | | | | | | | | 5.8 | | |
| H .70 | | 3.5 | 3.5 | 7.0 | 7.0 | | 7.0 | 3.5 | | | | | | | | | | 11.0 | | |
| B .80 | | 4.2 | 4.2 | | | | | 2.1 | | | | | | | | | | 31.5 | | |
| | | | | | | | | | | | | | | | | | | 10.5 | | |

Table V (Cont'd)
Record of the Larvae of Jack Mackerel (*Trachurus symmetricus*), 1955

Midpoint of Size Class (in mm.)

| Station | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.26 and over | Total |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|----------------------|-------|
| Cruise 5505 (cont'd): | | | | | | | | | | | | | | | | | | | |
| 100.40 | 2.8 | 2.8 | 2.8 | | | | | | | | | | | | | | | | 8.4 |
| .45 | 3.1 | | | | | | | | | | | | | | | | | | 3.1 |
| .60 | | | | 6.3 | 3.2 | 3.2 | | | | | | | | | | | | | 12.7 |
| .65 | | | | 3.0 | | | 3.0 | | | | | | | | | | | | 3.0 |
| .80 | | | | | | | 3.0 | | | 3.0 | | | | | | | | | 9.0 |
| .85 | | | | | | | | | | | | | | | | | | | 6.5 |
| .90 | | | 6.5 | | | | | | | | | | | | | | | | 9.3 |
| 103.45 | | | 6.2 | | | | | | | | | | | | | | | | 2.9 |
| .50 | | | 2.9 | | | | | | | | | | | | | | | | 16.0 |
| .55 | | | 3.2 | | | | | | | | | | | | | | | | 12.9 |
| .65 | | | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.3 |
| .70 | | | | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 8.7 |
| .75 | | | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 21.7 |
| .90 | | | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 15.9 |
| 107.40 | 2.5 | | | | | | | | | | | | | | | | | | 2.5 |
| .45 | | 3.1 | 3.1 | 6.1 | | | | | | | | | | | | | | | 12.3 |
| .50 | | | 6.2 | 3.1 | 12.4 | 6.2 | 3.1 | | | 6.2 | | | | | | | | | 37.2 |
| .55 | | | | | | | | | | | | | | | | | | | 2.7 |
| .65 | | | | 12.4 | 6.2 | 3.1 | | | 2.7 | | | | | | | | | | 24.8 |
| .70 | | | 3.2 | | | | | | | | | | | | | | | | 6.4 |
| .75 | | | | | 3.0 | | | | | | | | | | | | | | 6.0 |
| .80 | | | | 5.7 | 22.9 | 14.3 | 5.7 | 2.9 | | | | | | | | | | | 51.5 |
| .85 | | | 3.1 | | 6.2 | 6.2 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 24.8 |
| .90 | | | | | 3.0 | 3.0 | 3.0 | 2.9 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 12.0 |
| 110.45 | | 5.9 | | 2.9 | 2.9 | | | 2.9 | | | | | | | | | | | 17.5 |
| .55 | | 2.6 | | 2.6 | | | | | | | | | | | | | | | 5.2 |
| .60 | | | | | | | | | | | | | | | | | | | 3.2 |
| .65 | | | 3.2 | 6.2 | 3.1 | | | | | | | | | | | | | | 12.4 |
| .70 | | 6.2 | 3.1 | 3.1 | | | | 3.1 | | | | | | | | | | | 21.7 |
| .75 | 6.2 | 11.6 | 8.7 | | | | | | | | | | | | | | | | 31.9 |
| .80 | 11.6 | 11.6 | 5.5 | 2.7 | | | | | | | | | | | | | | | 8.2 |
| .85 | 3.0 | 12.2 | 18.3 | 12.2 | 3.0 | | | | | | | | | | | | | | 48.7 |
| .90 | 2.6 | | | 5.3 | | | | | | | | | | | | | | | 7.9 |
| 113.35 | | | | 6.7 | | | | | | | | | | | | | | | 10.0 |
| .40 | | | | | | | | | | | | | | | | | | | 3.3 |
| .45 | | | 6.3 | 15.8 | | 3.2 | | | | | | | | | | | | | 37.9 |
| .50 | | 2.8 | 5.7 | | | | 5.7 | | | | | | | | | | | | 51.0 |
| .55 | | | 9.1 | 3.0 | | | | | | | | | | | | | | | 12.1 |
| .75 | | | 3.0 | 3.0 | | | | 3.0 | | | | | | | | | | | 6.0 |
| .80 | 22.8 | 32.6 | 6.5 | 3.3 | | 3.3 | | 3.3 | | | | | | | | | | | 71.8 |
| 117.35 | | | | | | | | | | | | | | | | | | | 2.7 |
| .40 | | | | 3.3 | | 3.3 | | | | | | | | | | | | | 6.6 |

Table V (Cont'd)
Record of the Larvae of Jack Mackerel (*Trachurus symmetricus*), 1955

Midpoint of Size Class (in mm.)

| Station | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.26 and over | Total |
|-----------------------|------|-------|-------|-------|-------|------|------|-------|------|------|------|------|-------|-------|-------|-------|-------|----------------------|--------|
| Cruise 5505 (cont'd): | | | | | | | | | | | | | | | | | | | |
| 117.45 | 7.4 | 9.8 | 2.4 | 2.4 | | | | 2.4 | | | | 2.4 | | | | | | | 26.8 |
| .50 | 2.2 | | 2.2 | | 4.5 | 2.2 | | 2.2 | 2.2 | | | | | | | | | | 15.5 |
| .55 | 6.4 | 15.9 | 9.5 | 3.2 | | | | | | | | | | | | | | | 35.0 |
| .60 | 5.7 | | | | | | | 2.8 | 5.7 | | | | | | | | | | 14.2 |
| .70 | | | 5.4 | | | | | | | | | | | | | | | | 5.4 |
| .80 | 2.6 | 2.6 | 2.6 | 2.6 | 4.8 | 4.8 | | 4.8 | 4.8 | | | 2.6 | | | | | | | 13.0 |
| 123.45 | | | | | 4.8 | 4.8 | | | 4.8 | | | | | | | | | | 19.2 |
| .60 | | | | | | | | | 5.5 | | | | | | | | | | 5.5 |
| 130.50 | | | 6.6 | | | | | | | | | | | | | | | | 6.6 |
| Total | 93.3 | 161.2 | 173.8 | 195.3 | 122.9 | 83.9 | 35.7 | 116.2 | 45.0 | 21.0 | | 5.0 | 2.9 | 3.1 | 3.5 | | | | 1062.8 |
| Cruise 5506: | | | | | | | | | | | | | | | | | | | |
| 60.60 | | | | 15.7 | | | | | | | | | | | | | | | 15.7 |
| 63.65 | | | 10.6 | 21.3 | 10.6 | | | | | | | | | | | | | | 42.5 |
| 67.65 | 2.8 | 5.7 | 5.7 | 8.5 | | | | | | | | | | | | | | | 22.7 |
| 70.70 | | 6.3 | | | | | | | | | | | | | | | | | 6.3 |
| .90 | 5.5 | 27.4 | 16.4 | 8.2 | | 2.7 | | | | | | | | | | | | | 60.2 |
| 73.70 | | | | 6.0 | 6.0 | | | | | | | | | | | | | | 12.0 |
| 77.70 | 14.0 | 17.4 | 20.9 | | 3.5 | | | | | | | | | | | | | | 55.8 |
| .80 | 2.6 | | | | | | | | | | | | | | | | | | 2.6 |
| .90 | | 3.6 | 21.8 | 18.2 | 3.6 | 7.3 | 3.6 | 5.9 | | | | | | | | | | | 58.1 |
| 80.70 | | 5.9 | | | | | | | | | | | | | | | | | 11.8 |
| .80 | 5.2 | 5.2 | 5.2 | | | | | | | | | | | | | | | | 15.6 |
| .90 | | 25.5 | 51.0 | 38.3 | 12.8 | | | | | | | | | | | | | | 127.6 |
| 83.55 | | | | 3.0 | | | | | | | | | | | | | | | 3.0 |
| .60 | | | 57.8 | 130.0 | 50.5 | 7.2 | 7.2 | 7.2 | | | | | | | | | | | 259.9 |
| .65 | | | 25.1 | 45.2 | 10.0 | | | | | | | | | | | | | | 85.3 |
| .70 | 18.1 | 42.3 | 157.0 | 217.4 | 54.4 | | | | | | | | | | | | | | 489.2 |
| .75 | | 20.8 | 242.2 | 221.4 | 62.3 | | | | | | | | | | | | | | 546.7 |
| .80 | 13.2 | 26.5 | 53.0 | | | | | | | | | | | | | | | | 92.7 |
| .85 | | 37.4 | 49.9 | 62.4 | | | | | | | | | | | | | | | 149.7 |
| .90 | | | | 23.3 | | | | | | | | | | | | | | | 23.3 |
| 87.55 | | | | 6.2 | | | | | | | | | | | | | | | 6.2 |
| .60 | | 14.4 | 43.3 | | | | | | | | | | | | | | | | 57.7 |
| .65 | 3.2 | 9.6 | 22.5 | 28.9 | 3.2 | | | | | | | | | | | | | | 67.4 |
| .70 | | | 14.8 | | | | | | | | | | | | | | | | 14.8 |
| .75 | 52.2 | 34.8 | 121.8 | 104.4 | 52.2 | 34.8 | | | | | | | | | | | | | 400.2 |
| .80 | | 6.5 | 13.0 | | | | | | 6.5 | | | | | | | | | | 26.0 |
| .90 | 5.8 | 8.7 | 5.8 | 2.9 | | | 2.9 | | | | | | | | | | | | 26.1 |
| 90.28 | | | 5.0 | | | | | | | | | | | | | | | | 5.0 |
| .50 | 2.9 | 5.8 | 11.6 | | | | | 2.9 | | | | | | | | | | | 23.2 |
| .55 | 22.5 | 73.1 | 56.2 | 33.7 | | | | | | | | | | | | | | | 185.5 |

Table V (Cont'd)
Record of the Larvae of Jack Mackerel (*Trachurus symmetricus*), 1955

Midpoint of Size Class (in mm.)

| Station | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.26 and over | Total |
|-----------------------|------|-------|-------|-------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|----------------------|-------|
| Cruise 5506 (cont'd): | | | | | | | | | | | | | | | | | | | |
| 90.60 | 39.8 | 73.0 | 112.9 | 66.4 | 13.3 | | 6.6 | | | | | | | | | | | | 312.0 |
| .65 | 41.5 | 290.6 | 470.6 | 110.7 | | | 13.8 | | | | | | | | | | | | 927.2 |
| .70 | | | 11.0 | | | | | 5.5 | | 5.5 | | | | | | | | | 22.0 |
| .75 | | 5.2 | 15.6 | 36.4 | 15.6 | 5.2 | | | | | | | | | | | | | 78.0 |
| 93.35 | | 3.1 | | 3.1 | | | | 3.1 | | | | | | | | | | | 9.3 |
| .40 | | 5.9 | | | | | | | | | | | | | | | | | 5.9 |
| .55 | | | | | | | | | | 5.0 | | | | | | | | | 10.0 |
| .70 | 20.5 | 51.2 | 92.2 | 184.3 | 81.9 | | | | | | | | | | | | | | 430.1 |
| .75 | | | 11.0 | 49.3 | 16.4 | 5.5 | 11.0 | | | | | | | | | | | | 93.2 |
| .80 | | | 6.1 | | 12.2 | | | | | | 6.1 | | | | | | | | 24.4 |
| 97.40 | | | 5.6 | 11.2 | | | | | | | | | | | | | | | 16.8 |
| .55 | 5.0 | 10.1 | 15.1 | 15.1 | 15.1 | 5.0 | | | | | | | | | | | | | 65.4 |
| 100.35 | | | | | | | | | | | | | | | | | | | 3.0 |
| .40 | 3.4 | 3.0 | 3.4 | 3.4 | | | | | | | | | | | | | | | 10.2 |
| .45 | | 17.7 | | | 5.9 | | | | | | | | | | | | | | 23.6 |
| .50 | | 4.5 | 13.4 | 35.7 | 17.8 | | | | | | | | | | | | | | 71.4 |
| .55 | 2.4 | | 2.4 | 4.8 | | | | | | | | | | | | | | | 9.6 |
| 103.50 | | | 2.6 | | | | | | | | | | | | | | | | 2.6 |
| .55 | | | 2.6 | 5.1 | | | | | 2.6 | 2.6 | | | | | | | | | 12.9 |
| .60 | | 2.9 | 2.9 | | | | | | | | | | | | | | | | 5.8 |
| .70 | | 2.9 | | | | | | | | | | | | | | | | | 2.9 |
| .75 | | | | | | | | 2.6 | | | | | | | | | | | 2.6 |
| .80 | | | 2.3 | 2.3 | | | | | 2.3 | | | | | | | | | | 6.9 |
| .85 | | 2.9 | 5.7 | | | | 2.9 | 5.8 | | | | | | | | | | | 17.3 |
| 107.45 | | | 5.6 | | | | | | | | | | | | | | | | 5.6 |
| .60 | | | | | | 2.6 | | | | | 2.6 | 2.6 | 2.6 | | | | | | 10.4 |
| .65 | | | | | | | 2.8 | | | | | | | | | | | | 5.6 |
| .75 | | | | | | | 2.6 | | | | | | | | | | | | 7.8 |
| .80 | | 2.9 | | | 5.2 | | | | | | | | | | | | | | 2.9 |
| .85 | | | | 3.2 | | | | | | | | | | | | | | | 3.2 |
| .90 | | 2.5 | | | | | | | 2.5 | | | | | | | | | | 5.0 |
| 110.35 | | 2.1 | 4.2 | | | | | | | | | | | | | | | | 6.3 |
| .45 | | | 2.2 | | | | | | | | | | | | | | | | 2.2 |
| .55 | | | | | | | | 2.4 | | 2.4 | | | | | | | | | 7.2 |
| .60 | | | | | | | | | | | | | | | | | | | 12.6 |
| .65 | 19.4 | 14.6 | 12.2 | | | 4.9 | 2.4 | | | | | | | | | | | | 55.9 |
| .70 | | | | | | | | | | | | | | | | | | | 2.5 |
| .75 | | | 2.5 | | | | | | 2.5 | | | | | | | | | | 2.5 |
| .80 | | | | | | | | 3.0 | | | | | | | | | | | 12.0 |
| .85 | | | | | | | 3.0 | | 3.0 | | | | | | | | | | 8.4 |
| .90 | 2.9 | 8.6 | 8.6 | 4.2 | 2.1 | 3.0 | 2.1 | | | | | | | | | | | | 20.1 |
| 113.35 | | | 2.2 | | | 4.5 | 2.2 | | | | | | | | | | | | 8.9 |
| .40 | 3.1 | | 3.1 | | 3.1 | 6.1 | 4.8 | | 3.1 | 2.4 | | | | | | | | | 24.6 |
| .45 | | | 2.4 | 4.8 | 9.6 | | | | | | | | | | | | | | 24.0 |

Table V (cont'd)
Record of the Larvae of Jack Mackerel (*Trachurus symmetricus*), 1955

| Station | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.26 and over | Total |
|---------------------------------|-------|-------|--------|--------|-------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|----------------------|--------|
| Midpoint of Size Class (in mm.) | | | | | | | | | | | | | | | | | | | |
| Cruise 5506 (cont'd): | | | | | | | | | | | | | | | | | | | |
| 113.50 | | | | | 3.1 | 3.1 | 2.9 | | | | | | | | | | | | 6.2 |
| .75 | | | | | | | | | | | | | | | | | | | 2.9 |
| .80 | | 3.2 | 12.9 | | | | | | | | | | | | | | | | 16.1 |
| 117.35 | | | | | 2.7 | | 2.7 | | | 1.8 | | | | | | | | | 1.8 |
| .40 | | | | | | | | | | | | | | | | | | | 5.4 |
| .50 | 4.6 | | | | | | | | | | | | | | | | | | 4.6 |
| .55 | | | | | | | | | | | | | | | | | | | 3.0 |
| .75 | | | | | | | | | | | | | | | | | | | 4.6 |
| .80 | | | | | | | | | | | | | | | | | | | 3.0 |
| 120.50 | | | | | | | | | | | | | | | | | | | 4.8 |
| .55 | | | | | | | | | | | | | | | | | | | 23.0 |
| .80 | | | | | | | | | | | | | | | | | | | 3.0 |
| 127.40 | | 11.3 | | | | | | | | | | | | | | | | | 3.1 |
| .55 | | | | | | | | | | | | | | | | | | | 5.4 |
| 130.60 | | | | | | | | | | | | | | | | | | | 11.3 |
| 137.40 | | | | | | | | | | | | | | | | | | | 5.9 |
| | | | | | | | | | | | | | | | | | | | 2.6 |
| | | | | | | | | | | | | | | | | | | | 2.8 |
| Total | 290.6 | 907.7 | 1852.7 | 1535.0 | 493.5 | 95.4 | 79.6 | 51.1 | 22.5 | 29.1 | 18.5 | 2.6 | 7.2 | | | | | | 5395.5 |
| Cruise 5507: | | | | | | | | | | | | | | | | | | | |
| 63.65 | | | | | 13.4 | | 26.9 | | 13.4 | | | | | | | | | | 53.7 |
| 67.50 | | | | | | | 3.1 | | | | | | | | | | | | 3.1 |
| .65 | | | | | 25.9 | | | 25.9 | | 13.0 | | | | | | | | | 64.8 |
| 70.55 | | | | 23.3 | | | | | | | | | | | | | | | 23.3 |
| .60 | | | | | | | | | | | | | | | | | | | 13.1 |
| .70 | | | | | | | | | | | | | | | | | | | 37.2 |
| .80 | | | | | | | | | | | | | | | | | | | 6.0 |
| .90 | | | | | | | | | | | | | | | | | | | 8.8 |
| 73.70 | | | | | | | | | | | | | | | | | | | 31.2 |
| .90 | | | | | | | | | | | | | | | | | | | 91.4 |
| 77.70 | | | | | | | | | | | | | | | | | | | 27.7 |
| .80 | | | | | | | | | | | | | | | | | | | 10.9 |
| 80.70 | | | | | | | | | | | | | | | | | | | 12.6 |
| .80 | | | | | | | | | | | | | | | | | | | 45.9 |
| .90 | | | | | | | | | | | | | | | | | | | 157.6 |
| 83.43 | | | | | | | | | | | | | | | | | | | 36.1 |
| 87.35 | | | | | | | | | | | | | | | | | | | 5.4 |
| .70 | | | | | | | | | | | | | | | | | | | 126.3 |
| 90.28 | | | | | | | | | | | | | | | | | | | 28.9 |
| .30 | | | | | | | | | | | | | | | | | | | 127.4 |
| | | | | | | | | | | | | | | | | | | | 8.3 |
| | | | | | | | | | | | | | | | | | | | 15.2 |

Table V (Cont'd)
Record of the Larvae of Jack Mackerel (*Trachurus symmetricus*), 1955

| Station | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.26 and over | Total |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|----------------------|-------|
| Cruise 5507 (cont'd): | | | | | | | | | | | | | | | | | | | |
| 90.37 | | | 3.2 | | | | | | | | | | | | | | | | 3.2 |
| .60 | | 8.4 | 11.2 | 5.6 | | 5.6 | | 5.6 | 5.6 | | | | | | | | | | 42.0 |
| .65 | | 6.0 | 3.0 | | 3.0 | | | 3.0 | 3.0 | | | | | | | | | | 18.0 |
| .70 | | 5.0 | | | 5.0 | | | 5.0 | | | | | | | | | | | 20.0 |
| .75 | | | | | | | | | 5.2 | | | | | | | | | | 5.2 |
| .80 | | | | | | 25.2 | 21.0 | 16.8 | 4.2 | 4.2 | | | | | | | | | 71.4 |
| .85 | | | 3.2 | | | 9.6 | 9.6 | 3.2 | 3.2 | 3.2 | | | | | | | | | 35.2 |
| .90 | | 7.1 | | | 7.1 | | | | | | | | | | | | | | 14.2 |
| 93.30 | | | | | | | | 5.8 | | | | | | | | | | | 5.8 |
| .60 | | | | 5.6 | | 5.6 | 5.6 | 44.5 | 27.8 | 5.6 | | | | | | | | | 94.7 |
| .65 | | | | | | | | 12.7 | 4.2 | 8.4 | 4.2 | | | | | | | | 29.5 |
| .70 | | | | | | | | 2.6 | | | | | | | | | | | 2.6 |
| .75 | | | | | | 2.8 | 2.8 | 2.8 | 2.8 | | | | 2.8 | | | | | | 14.0 |
| .80 | | 2.7 | | | 2.7 | 8.0 | 13.3 | 13.3 | 29.3 | 13.3 | | | 2.7 | | | | | | 85.3 |
| .85 | | | | 3.3 | | | 3.3 | 6.6 | 3.3 | | | | | | | | | | 16.5 |
| 97.32 | | | | | 2.8 | | | | | | | | | | | | | | 2.8 |
| .55 | | | | | | | | | | | | 6.4 | | | | | | | 6.4 |
| .60 | | | | | | | | | | | | | | | 2.9 | | | | 2.9 |
| .90 | | | | | | | | | | | | 18.4 | | | | | | | 18.4 |
| 100.70 | 2.9 | | | | | | | | | | | | | | | | | | 2.9 |
| .80 | | | | | | | | | 2.9 | | | | | | | | | | 2.9 |
| .85 | | | | 3.1 | | | | | | | | | | | | | | | 6.2 |
| .90 | | | | | | | 6.0 | 6.0 | 6.0 | | | 3.1 | | | | | | | 30.0 |
| 103.60 | | | | | | | | | | 2.8 | | 6.0 | | | | | | | 2.8 |
| .65 | | | | | | | | | | 5.0 | | | | | | | | | 10.0 |
| .70 | | | | | 3.0 | 3.0 | | | | | | | | | | | | | 6.0 |
| .80 | | | | | | | | | 2.8 | | | | | | | | | | 2.8 |
| .90 | | | | | | | | | 3.4 | | | | | | | | | | 3.4 |
| 107.70 | | | | 6.0 | 6.0 | | 3.0 | | | | | | | | | | | | 15.0 |
| .75 | | | | | 11.0 | 8.2 | | | 2.7 | | | | | | | | | | 21.9 |
| .80 | | | | 9.9 | 3.3 | 6.6 | | | | | | | | | | | | | 19.8 |
| 110.45 | 3.2 | | | | | | | | | | | | | | | | | | 3.2 |
| .60 | | | 2.7 | | | | | 2.7 | | | | | | | | | | | 5.4 |
| .70 | | 2.6 | | | | | | | | | | | | | | | | | 2.6 |
| .90 | | | | | | | | | | | | | | | | | | | 2.8 |
| 113.55 | | | | | | | 5.1 | | | | | | | | | | | | 5.1 |
| .70 | | | | | | | | | | | | | | | | | | | 6.0 |
| .75 | | | | | | | | | 2.6 | | | | | | 2.6 | | | | 5.2 |
| .80 | | | | | | | | | | | | | | | | | | | 2.7 |
| 117.40 | | | | | | | 2.7 | | | | | | | | | | | | 2.4 |
| .65 | | | | | 2.7 | | | | | | | | | | 2.4 | | | | 5.4 |
| 120.45 | | | | 6.0 | | | | | | | | | | | | | | | 6.0 |
| .50 | | 3.0 | 12.0 | 6.0 | 6.0 | | | | | | | | | | | | | | 27.0 |
| .60 | | | | | | | | 2.7 | 5.4 | | | | | 2.7 | | | | | 10.8 |

Table V (Cont'd)
Record of the Larvae of Jack Mackerel (*Trachurus symmetricus*), 1955

| Station | Midpoint of Size Class (in mm.) | | | | | | | | | | | | | | | | | 15.26 and over | Total |
|-----------------------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|-------|-------|-------|-------|-------|----------------------|--------|
| | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | | |
| Cruise 5507 (cont'd): | | | | | | | | | | | | | | | | | | | |
| 123.50 | | 17.8 | 11.9 | | 3.0 | 5.9 | | | | | | | | | | | | | 38.6 |
| .60 | | | | | 2.8 | 2.8 | | | | | | | | | | | | | 5.6 |
| 127.40 | | | | | | 2.7 | | | | | | | | | | | | | 2.7 |
| .55 | | | | | 2.4 | | | | | | | | | | | | | | 2.4 |
| 130.50 | | | | 2.8 | | | | | | | | | | | | | | | 2.8 |
| .60 | | 2.6 | | | | | | | | | | | | | | | | | 2.6 |
| 133.50 | | 2.7 | 2.7 | 11.0 | | 2.7 | | | | | | | | | | | | | 19.1 |
| Total | 30.9 | 197.6 | 189.3 | 176.5 | 141.9 | 129.3 | 166.7 | 337.4 | 189.0 | 64.3 | 28.1 | 38.1 | 2.7 | 5.1 | 8.2 | | | | 1705.1 |
| Cruise 5510: | | | | | | | | | | | | | | | | | | | |
| 100.80 | | | | | | | | | | | | | 2.2 | | | | | | 2.2 |
| Total | | | | | | | | | | | | | 2.2 | | | | | | 2.2 |

RECORD OF THE LARVAE OF THE PACIFIC MACKEREL
(PNEUMATOPHORUS DIEGO), 1955

The distribution and abundance of Pacific mackerel larvae in 1955 are shown in figure 6. The categories of abundance are identical to those already described for other species; individual station values represent the cumulative standard haul total for the year.

The larvae are reported by size class in table VI. The size classes have the same midpoints and ranges as those given for the jack mackerel. The data are further summarized in text table 8.

Pacific mackerel larvae are much less abundant than those of the other fishes included in this report. They make up only slightly more than one-half percent of the larvae collected in 1955; they were obtained in 92 collections. The larvae were taken in all areas south of Point Conception. The largest number was obtained off upper central Baja California (lines 110-120); they were collected from March through July in this region. Off southern California, Pacific mackerel larvae were collected in June and July; there were only seven occurrences in this region. The coverage off southern Baja California was too fragmentary to delimit the seasonal distribution in this area.

The lack of Pacific mackerel larvae during the last five months of the year must partly reflect the sparse coverage during these months in 1955. Certainly, larger numbers were taken during these months in previous years, as can be seen by comparing the monthly totals for 1955 with those of the four previous years (text table 7).

Text table 7.--Monthly abundance of Pacific mackerel larvae,
1951-1955. (standard haul totals)

| | 1951 | 1952 | 1953 | 1954 | 1955 |
|-----------|-------|------|-------|-------|-------|
| January | 0 | 5 | 27 | 1,219 | 136 |
| February | 4 | 43 | 32 | 22 | 14 |
| March | 58 | 54 | 122 | 153 | 215 |
| April | 114 | 184 | 115 | 84 | 608 |
| May | 204 | 150 | 259 | 90 | 86 |
| June | 77 | 116 | 320 | 472 | 667 |
| July | 14 | 95 | 44 | 167 | 221 |
| August | 455 | 43 | 251 | 214 | - |
| September | 83 | 104 | 58 | - | 0 |
| October | 0 | 46 | 59 | 58 | 0 |
| November | 89 | 10 | - | - | 0 |
| December | 9 | - | 21 | 86 | 3 |
| Total | 1,107 | 850 | 1,308 | 2,565 | 1,950 |

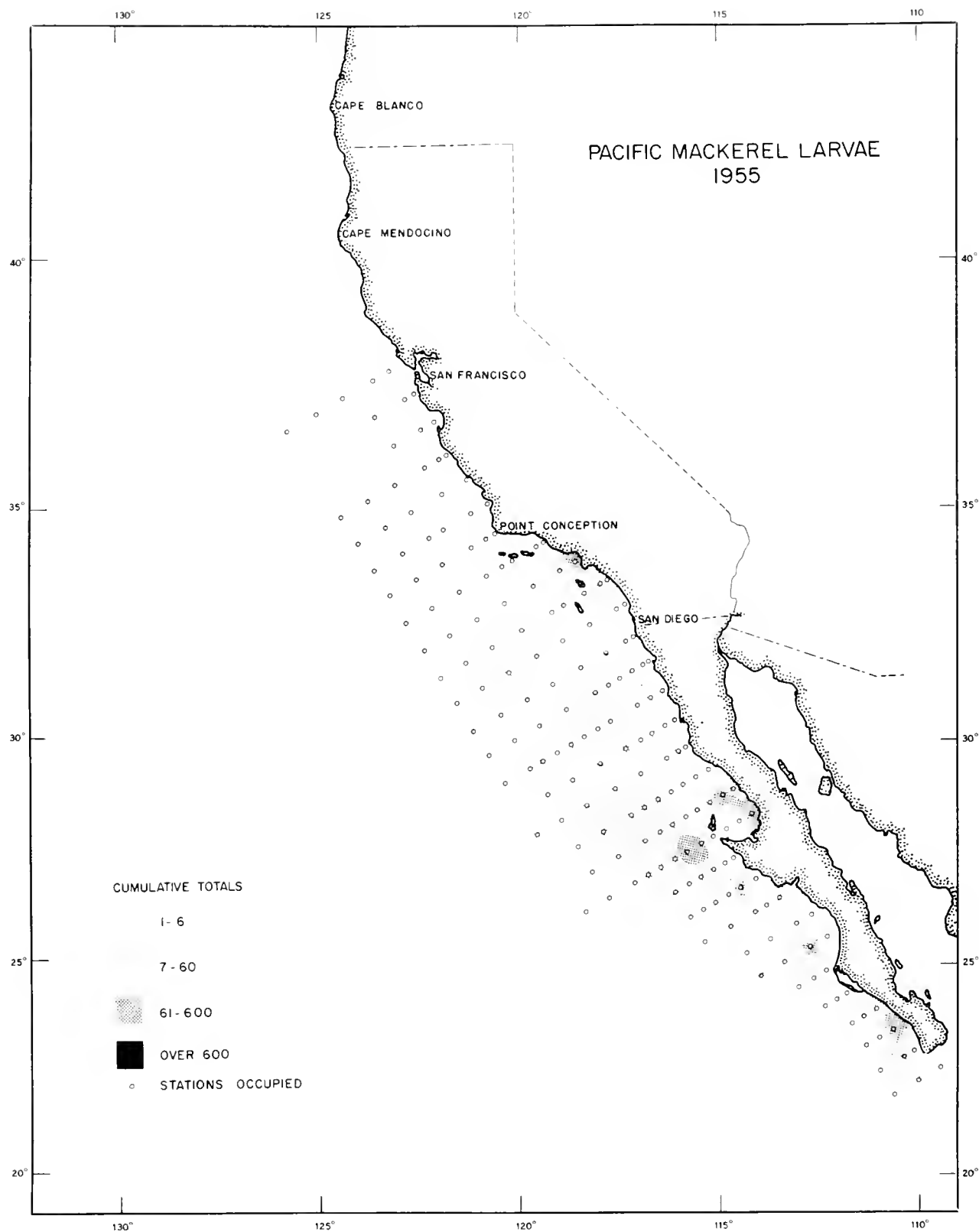


Figure 6.--Pacific mackerel larvae, 1955: distribution and relative abundance.

Text table 8.--Occurrence and abundance (standard haul totals) of Pacific mackerel larvae
(Pneumatophorus diego), by month and area, in hauls made during 1955

| Cruise | Central California 60-77 | | Southern California 80-93 | | Northern Baja California 97-107 | | Upper central Baja California 110-120 | | Lower central Baja California 123-137 | | Southern Baja California 140-157 | | Total | |
|---------|--------------------------------|-------------|---------------------------------|-------------|---------------------------------------|-------------|---|-------------|---|-------------|--|-------------|------------------|-------------|
| | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber | Occur- rences | Num- ber |
| 5501 | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 136 | 3 | 136 |
| 5502 | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 14 | 1 | 14 |
| 5503 | - | - | 0 | 0 | 0 | 0 | 4 | 66 | 7 | 147 | 1 | 2 | 12 | 215 |
| 5504 | - | - | 0 | 0 | 11 | 96 | 22 | 507 | 2 | 5 | - | - | 35 | 608 |
| 5505 | 0 | 0 | 0 | 0 | 6 | 40 | 3 | 18 | 3 | 28 | - | - | 12 | 86 |
| 5506 | 0 | 0 | 4 | 39 | 3 | 16 | 6 | 524 | 2 | 88 | - | - | 15 | 667 |
| 5507 | 0 | 0 | 3 | 97 | 0 | 0 | 5 | 103 | 5 | 21 | - | - | 13 | 221 |
| 5508 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5509 | - | - | 0 | 0 | - | - | - | - | - | - | - | - | 0 | 0 |
| 5510 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | 0 | 0 |
| 5511 | - | - | 0 | 0 | - | - | - | - | - | - | - | - | 0 | 0 |
| 5512 | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 3 |
| Total | 0 | 0 | 7 | 136 | 20 | 152 | 40 | 1,218 | 19 | 289 | 6 | 155 | 92 | 1,950 |
| Percent | 0 | 0 | 7.0 | 7.8 | 62.4 | 14.8 | 7.9 | 99.9 | | | | | | |

Table VI
Record of the Larvae of Pacific Mackerel (*Pneumatophorus diego*), 1955

| Station | Midpoint of Size Class (in mm.) | | | | | | | | | | | | | | Total | | | |
|--------------|---------------------------------|------|-------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 12.75 | | 13.75 | 14.75 | 15.26 |
| Cruise 5501: | | | | | | | | | | | | | | | | | | |
| 150.19 | | 36.4 | 26.5 | 19.9 | 3.3 | | 6.6 | | | | | | | | | | | 92.7 |
| 153.20 | 11.0 | 18.4 | 11.0 | | | 2.8 | | | | | | | | | | | | 40.4 |
| 157.20 | | | | | | | | | | | | | | | | | | 2.8 |
| Total | 11.0 | 54.8 | 37.5 | 19.9 | 3.3 | 2.8 | 6.6 | | | | | | | | | | | 135.9 |
| Cruise 5502: | | | | | | | | | | | | | | | | | | |
| 147.20 | 8.3 | | | 5.6 | | | | | | | | | | | | | | 13.9 |
| Total | 8.3 | | | 5.6 | | | | | | | | | | | | | | 13.9 |
| Cruise 5503: | | | | | | | | | | | | | | | | | | |
| 117.50 | | | 9.2 | 3.1 | | | | | | | | | | | | | | 12.3 |
| .55 | 8.3 | 11.0 | | | | | | | | | | | | | | | | 19.3 |
| .60 | 3.8 | | | | | | | | | | | | | | | | | 3.8 |
| 120.55 | 3.0 | 12.1 | 15.2 | | | | | | | | | | | | | | | 30.3 |
| 123.50 | 1.8 | | | | | | | | | | | | | | | | | 1.8 |
| .55 | | | 2.7 | | | | | | | | | | | | | | | 2.7 |
| .60 | | 2.7 | | | | | | | | | | | | | | | | 2.7 |
| 127.40 | 4.7 | 30.6 | 87.0 | 7.0 | | | | | | | | | | | | | | 129.3 |
| 130.40 | | | 2.8 | 2.8 | | | | | | | | | | | | | | 5.6 |
| .50 | 2.7 | | | | | | | | | | | | | | | | | 2.7 |
| 137.30 | | 2.2 | | | | | | | | | | | | | | | | 2.2 |
| 147.25 | 1.9 | | | | | | | | | | | | | | | | | 1.9 |
| Total | 26.2 | 58.6 | 116.9 | 12.9 | | | | | | | | | | | | | | 214.6 |
| Cruise 5504: | | | | | | | | | | | | | | | | | | |
| 100.50 | | | 6.3 | | | | | | | | | | | | | | | 6.3 |
| .60 | | | 2.9 | | | | | | | | | | | | | | | 2.9 |
| H103.35 | | | 7.4 | | | | | | | | | | | | | | | 7.4 |
| B .65 | | | 5.5 | 5.5 | | | | | | | | | | | | | | 11.0 |
| B .75 | | | | | | | | | | | | | | | | | | 22.5 |
| B .80 | | 5.6 | 16.9 | | | | 2.5 | | | | | | | | | | | 5.0 |
| H107.40 | | | 2.5 | | | | | | | | | | | | | | | 4.2 |
| H .50 | | 4.2 | | | | | | | | | | | | | | | | 22.2 |
| H .60 | | | | 6.3 | 12.7 | 3.2 | | | | | | | | | | | | 4.8 |
| H .70 | | | | | 4.8 | | | | | | | | | | | | | 5.8 |
| H .80 | | 2.9 | 2.9 | | | | | | | | | | | | | | | 3.1 |
| H110.40 | | | | | | | | | | | | | | | | | | 3.7 |
| H .50 | | | | 3.5 | | | | | 3.1 | | | | | | | | | 3.5 |

Table VI (Cont'd)
Record of the Larvae of Pacific Mackerel (*Pneumatophorus diego*), 1955

Midpoint of Size Class (in mm.)

| Station | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.26 | Dls. | Total |
|-----------------------|------|------|-------|-------|-------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|------|-------|
| Cruise 5504 (cont'd): | | | | | | | | | | | | | | | | | | | | |
| B110.60 | | | | | | | 3.6 | | | | | | | | | | | | | 3.6 |
| H .70 | | | 2.6 | | | 2.6 | | 6.1 | 3.1 | | | | | | | | | | | 5.2 |
| H .90 | | | | | | | | | | | | | | | | | | | | 9.2 |
| H113.45 | | | | 3.0 | | | | | | | | | | | | | | | | 3.0 |
| H .50 | | | | | | | | | | | | | | | | | | | | 9.6 |
| H .55 | | | | | | | | | | | | | | | | | | | | 11.6 |
| H .60 | | | 5.4 | 16.3 | 10.9 | 16.3 | | | | 2.9 | | | | | | | | | | 48.9 |
| B .60 | 2.8 | 2.8 | 2.8 | 5.6 | | | 2.8 | | | | | | | | | | | | | 16.8 |
| H .70 | | | 21.8 | 10.9 | 14.6 | | | 3.6 | | | | | | | | | | | | 50.9 |
| H117.35 | | | 3.2 | | | | | | | | | | | | | | | | | 3.2 |
| H .40 | 2.6 | | 2.6 | | | | | | | | | | | | | | | | | 5.2 |
| H .55 | | | 11.5 | | | | | | | | | | | | | | | | | 11.5 |
| H .60 | | | | | | | | | | | | | | | | | | | | 26.1 |
| H .70 | 3.5 | 3.5 | 17.6 | 17.6 | | 2.9 | 11.6 | 8.7 | 2.9 | | | | | | | | | | | 52.7 |
| B120.50 | | | 16.6 | 72.0 | 16.6 | 3.5 | 7.0 | | | | | | | | | | | | | 105.2 |
| B .55 | | | | | | | | | 2.8 | | | | | | | | | | | 2.8 |
| H .60 | | | | | | | | 5.7 | | | | | | | | | | | | 5.7 |
| B(1).60 | | | 5.6 | 11.2 | 14.0 | 11.2 | 8.4 | 14.0 | | | | | | | | | | | | 64.4 |
| B(2).60 | | | | | | | | | | 5.1 | | | | | | | | | | 5.1 |
| B .65 | | | 2.8 | 8.5 | 19.8 | 11.3 | 2.8 | 5.6 | 5.6 | 2.8 | | | | | | | | | | 59.2 |
| B123.50 | | | | | | | 2.6 | 2.6 | | | | | | | | | | | | 2.6 |
| H127.40 | | | | | | | | | 2.6 | | | | | | | | | | | 2.6 |
| Total | 8.9 | 24.4 | 153.6 | 155.0 | 108.1 | 37.5 | 39.6 | 46.3 | 20.1 | 10.8 | 3.2 | | | | | | | | | 607.5 |
| Cruise 5505: | | | | | | | | | | | | | | | | | | | | |
| 97.30 | | 5.1 | | | | | | | | | | | | | | | | | | 5.1 |
| .40 | | | 3.0 | | | | | | | | | | | | | | | | | 3.0 |
| 103.35 | | | | | | | | | | | | | | | | | | | | 12.3 |
| .50 | | | 3.2 | | | 3.1 | 6.1 | 3.1 | | | | | | | | | | | | 12.8 |
| .55 | | | 3.2 | | | 3.2 | | 3.2 | 3.2 | | | | | | | | | | | 3.2 |
| 107.45 | | | | | | | | | | | | | | | | | | | | 3.1 |
| 110.35 | | 3.1 | 3.1 | 6.1 | | 3.1 | | | | | | | | | | | | | | 12.3 |
| 113.45 | | | 3.2 | | | | | | | | | | | | | | | | | 3.2 |
| 117.35 | | | 2.7 | | | | | | | | | | | | | | | | | 2.7 |
| 123.45 | | | | | | | | | | | | | | | | | | | | 14.4 |
| 130.30 | | | | 4.8 | 4.8 | 4.8 | | | | | | | | | | | | | | 10.6 |
| 137.30 | | 2.8 | 10.6 | | | | | | | | | | | | | | | | | 2.8 |
| Total | 11.0 | 29.0 | 10.9 | 4.8 | 4.8 | 14.2 | 6.1 | 6.3 | 3.2 | | | | | | | | | | | 85.5 |

Table VI (Cont'd)
Record of the Larvae of Pacific Mackerel (*Pneumatophorus diego*), 1955

Midpoint of Size Class (in mm.)

| Station | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.75 | 6.75 | 7.75 | 8.75 | 9.75 | 10.75 | 11.75 | 12.75 | 13.75 | 14.75 | 15.26 | Dis. | Total |
|--------------|------|-------|-------|-------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|------|-------|
| Cruise 5506: | | | | | | | | | | | | | | | | | | | | |
| 83.70 | | | | 6.0 | | | | | | | | | | | | | | | | 6.0 |
| 87.40 | | | 2.5 | | | | | | | | | | | | | | | | | 2.5 |
| 90.60 | | 6.6 | 13.3 | | | | | | | | | | | | | | | | | 19.9 |
| 93.70 | | | | 10.2 | | | | | | | | | | | | | | | | 10.2 |
| 100.35 | | | 3.0 | | 3.0 | | | | | | | | | | | | | | | 6.0 |
| .45 | | | 5.9 | | | | | | | | | | | | | | | | | 5.9 |
| .50 | | | 4.5 | | | | | | | | | | | | | | | | | 4.5 |
| 117.30 | | 34.9 | 221.2 | 58.2 | 5.8 | 23.3 | 5.8 | | | | | | | | | | | | | 349.2 |
| .35 | | | 5.4 | | | | | | | | | | | | | | | | | 5.4 |
| .50 | | | 2.3 | | | | | | | | | | | | | | | | | 2.3 |
| 120.25 | 2.1 | 2.1 | 14.6 | 31.4 | 2.1 | 2.1 | 2.1 | | | | | | | | | | | | 2.1 | 69.0 |
| .45 | 4.9 | 59.3 | 19.8 | | | | | | 4.9 | | | | | | | | | | | 88.9 |
| .50 | | 6.0 | | | | | | | | | | | | | | | | | 3.0 | 9.0 |
| 137.30 | 7.3 | 21.8 | 38.7 | 7.3 | 2.4 | | | | | | | | | | | | | | | 77.5 |
| .50 | | 5.5 | 5.5 | | | | | | | | | | | | | | | | | 11.0 |
| Total | 14.3 | 136.2 | 336.7 | 113.1 | 23.7 | 25.4 | 7.9 | | 4.9 | | | | | | | | | | 5.1 | 667.3 |
| Cruise 5507: | | | | | | | | | | | | | | | | | | | | |
| 87.35 | 26.4 | 37.0 | 5.3 | 7.9 | | 2.6 | | | | | | | | | | | | | | 79.2 |
| 90.28 | | 2.8 | | | | | | | | | | | | | | | | | | 2.8 |
| .30 | | 3.8 | 11.4 | | | | | | | | | | | | | | | | | 15.2 |
| 117.26 | | | | 4.4 | 8.8 | 4.4 | 4.4 | 4.4 | | | | | 4.4 | | | | | | | 30.8 |
| 120.25 | 6.1 | 20.2 | 20.2 | 4.0 | | 2.0 | | | | | | | | | | | | | | 52.5 |
| .40 | 2.3 | 2.3 | | | | | | | | | | | | | | | | | | 4.6 |
| .45 | | | | | | 6.0 | | | | | | | | | | | | | | 6.0 |
| .50 | 3.0 | | 3.0 | | | 3.0 | | | | | | | | | | | | | | 9.0 |
| 123.40 | | | | | | 3.0 | 6.3 | 3.0 | | | | | | | | | | | | 6.3 |
| .45 | | | | | | | | | | | | | | | | | | | | 3.0 |
| .50 | | | | | 3.0 | | | | | | | | | | | | | | | 3.0 |
| .60 | | | | | | | | | | | | | | | | | | | | 5.6 |
| 127.50 | | | 2.8 | | | | | | 2.8 | | | 2.8 | | | | | | | | 2.8 |
| Total | 37.8 | 66.1 | 42.7 | 16.3 | 11.8 | 18.0 | 10.7 | 7.4 | 2.8 | | | 2.8 | | | 4.4 | | | | | 220.8 |
| Cruise 5512: | | | | | | | | | | | | | | | | | | | | |
| 147.20 | | | | | | | | | | | | | | 2.6 | | | | | | 2.6 |
| Total | | | | | | | | | | | | | | 2.6 | | | | | | 2.6 |

RECORD OF THE LARVAE OF HAKE (MERLUCCIIUS PRODUCTUS), 1955

The larvae of the hake have not been routinely measured, hence table VII contains only the standard haul total of hake larvae at stations occupied during 1955. The data are further summarized in text table 10, and illustrated in figure 7.

No hake larvae were obtained off central California in 1955, but inasmuch as no cruises were made in this area during January through April, the failure to collect hake larvae probably reflects the inadequate coverage in this area rather than their actual absence from the area. Hake larvae were obtained off central California in all previous surveys (1949 through 1954).

The greatest abundance occurred off upper central Baja California (lines 110-120) in 1955. The center of abundance is further south than in 1951 or 1952. In 1951, the largest concentration of larvae occurred off southern California, and in 1952 off northern Baja California.

This species ranked second in abundance in 1955, constituting one larva out of every six collected. Although hake larvae were taken throughout the year, over 99% of them were obtained during the first four months of 1955. This is the usual period of abundance. A similar seasonal distribution was reported by Ahlstrom and Counts (1955) for 1951 and 1952; 98.6% of hake larvae were obtained during these months in 1951, and 99.5% in 1952. However, in both 1951 and 1952, the month of peak abundance of larvae was March, while it was February in 1953 and 1955, and January in 1954. The monthly abundance of hake larvae in 1951 through 1955 is summarized in text table 9.

Text table 9.--Monthly abundance of hake larvae, 1951-1955
(standard haul totals)

| | 1951 | 1952 | 1953 | 1954 | 1955 |
|-----------|--------|--------|--------|--------|--------|
| January | 222 | 784 | 9,206 | 20,764 | 13,356 |
| February | 6,751 | 17,224 | 19,116 | 10,352 | 28,973 |
| March | 41,548 | 24,081 | 8,045 | 17,592 | 12,535 |
| April | 13,411 | 15,020 | 1,544 | 6,100 | 4,757 |
| May | 584 | 466 | 753 | 954 | 176 |
| June | 174 | 108 | 159 | 127 | 19 |
| July | 17 | 3 | 19 | 17 | 3 |
| August | 2 | 5 | 17 | 24 | - |
| September | 14 | 0 | 19 | - | 3 |
| October | 10 | 9 | 41 | 25 | 28 |
| November | 17 | 0 | 39 | - | 5 |
| December | 64 | - | 295 | 324 | 235 |
| Total | 62,814 | 57,700 | 39,253 | 56,279 | 60,090 |

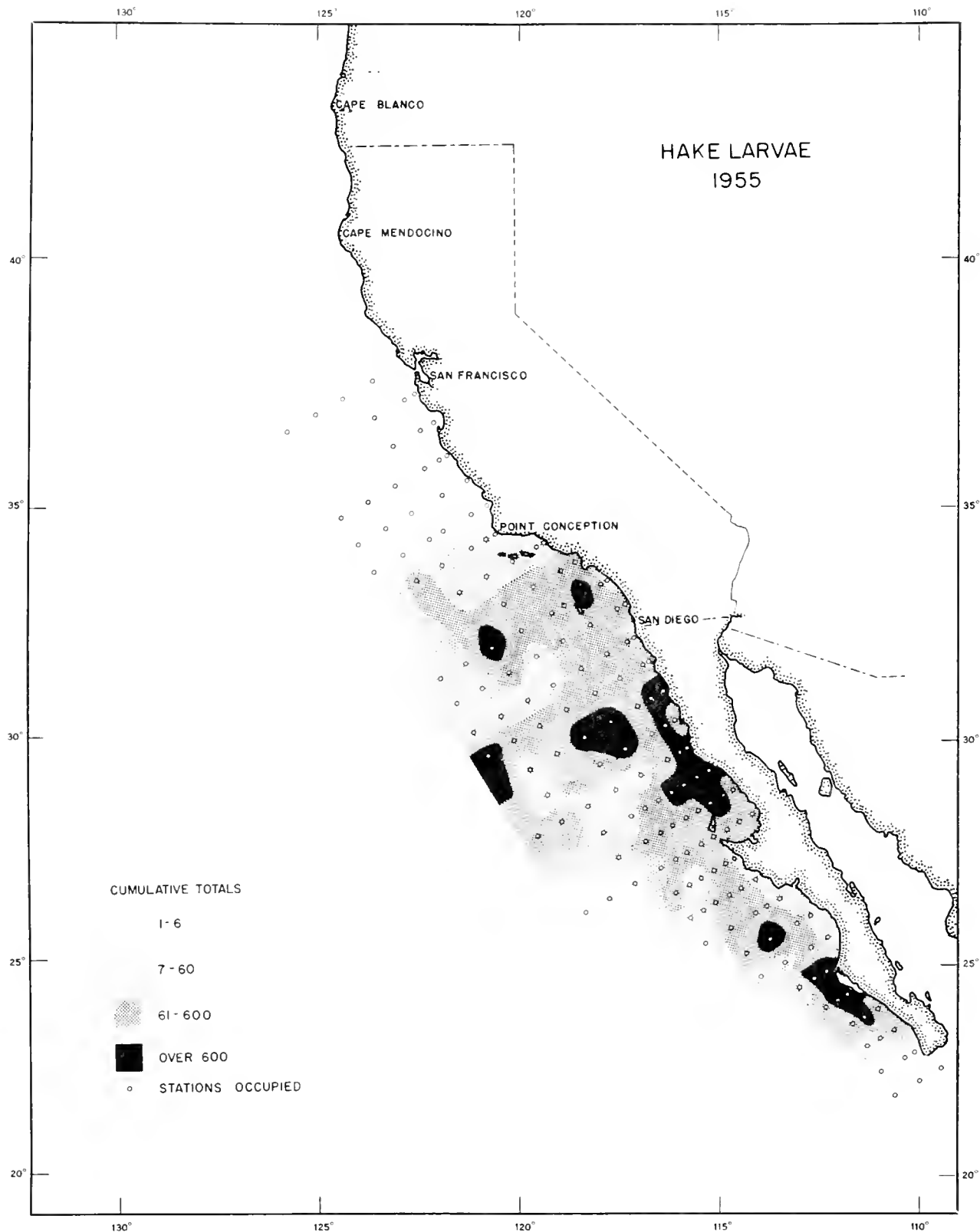


Figure 7.--Hake larvae, 1955: distribution and relative abundance

Text table 10.--Occurrence and abundance (standard haul totals), of hake larvae (Merluccius productus), by month and area, in hauls made during 1955

| Cruise | Central California 60-77 | | Southern California 80-93 | | Northern Baja California 97-107 | | Upper central Baja California 110-120 | | Lower central Baja California 123-137 | | Southern California 140-157 | | Total | |
|---------|--------------------------|------|---------------------------|-------|---------------------------------|--------|---------------------------------------|--------|---------------------------------------|-------|-----------------------------|--------|--------|--------|
| | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- | Occur- | Num- |
| | rences | ber | rences | ber | rences | ber | rences | ber | rences | ber | rences | ber | rences | ber |
| 5501 | - | - | 16 | 1,331 | 16 | 660 | 21 | 3,430 | 9 | 120 | 8 | 7,815 | 70 | 13,356 |
| 5502 | - | - | 22 | 2,834 | 20 | 5,391 | 26 | 15,588 | 16 | 1,260 | 11 | 3,900 | 95 | 28,973 |
| 5503 | - | - | 23 | 422 | 24 | 6,997 | 30 | 2,818 | 24 | 1,291 | 16 | 1,007 | 117 | 12,535 |
| 5504 | - | - | 12 | 326 | 32 | 2,886 | 29 | 1,469 | 10 | 76 | - | - | 83 | 4,757 |
| 5505 | 0 | 0 | 8 | 32 | 8 | 40 | 9 | 33 | 6 | 71 | - | - | 31 | 176 |
| 5506 | 0 | 0 | 1 | 6 | 0 | 0 | 1 | 3 | 2 | 10 | - | - | 4 | 19 |
| 5507 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | - | - | 1 | 3 |
| 5508 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5509 | - | - | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | 1 | 3 |
| 5510 | 0 | 0 | 1 | 2 | 2 | 10 | 3 | 16 | 0 | 0 | - | - | 6 | 28 |
| 5511 | - | - | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | 1 | 5 |
| 5512 | - | - | 4 | 17 | 2 | 7 | 12 | 196 | 2 | 12 | 1 | 3 | 21 | 235 |
| Total | 0 | 0 | 89 | 4,978 | 104 | 15,991 | 131 | 23,553 | 70 | 2,843 | 36 | 12,725 | 430 | 60,090 |
| Percent | 0 | 0 | 8.3 | 26.6 | 39.2 | 4.7 | 21.2 | 100.0 | | | | | | |

Table VII
Record of the Larvae of Hake (Merluccius productus), 1955

| | Cruise and Month | | | | | | | | | | 1/ | 2/ |
|-------|------------------|------|------|------|------|------|------|------|-------|------|------|------|
| | 5501 | 5502 | 5503 | 5504 | 5505 | 5506 | 5507 | 5508 | 5509 | 5510 | 5511 | 5512 |
| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
| 60.55 | - | - | - | - | - | - | - | N | S | | S | - |
| .60 | - | - | - | - | - | - | - | O | P | | P | - |
| .70 | - | - | - | - | - | - | - | R | E | | E | - |
| .80 | - | - | - | - | - | - | - | P | C | | C | - |
| .90 | - | - | - | - | - | - | - | A | I | | I | - |
| 63.52 | - | - | - | - | - | - | - | C | A | | A | - |
| .55 | - | - | - | - | - | - | - | - | L | | L | - |
| .65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 67.50 | - | - | - | - | - | - | - | - | - | - | - | - |
| .55 | - | - | - | - | - | - | - | - | - | - | - | - |
| .65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 70.52 | - | - | - | - | - | - | - | - | - | - | - | - |
| .55 | - | - | - | - | - | - | - | - | - | - | - | - |
| .60 | - | - | - | - | - | - | - | - | - | - | - | - |
| .70 | - | - | - | - | - | - | - | - | - | - | - | - |
| .80 | - | - | - | - | N.Q. | - | - | - | - | - | - | - |
| .90 | - | - | - | - | - | - | - | - | - | - | - | - |
| 73.50 | - | - | - | - | - | - | - | - | - | - | - | - |
| .60 | - | - | - | - | - | - | - | - | - | - | - | - |
| .70 | - | - | - | - | - | - | - | - | - | - | - | - |
| .80 | - | - | - | - | N.Q. | - | - | - | - | - | - | - |
| .90 | - | - | - | - | - | - | - | - | - | - | - | - |
| 77.50 | - | - | - | - | - | - | - | - | - | - | - | - |
| .55 | - | - | - | - | - | - | - | - | - | - | - | - |
| .65 | - | - | - | - | - | - | - | - | - | - | - | - |
| .70 | - | - | - | - | - | - | - | - | - | - | - | - |
| .80 | - | - | - | - | - | - | - | - | - | - | - | - |
| .90 | - | - | - | - | - | - | - | - | - | - | - | - |
| 80.51 | - | - | 3 | - | - | - | - | - | - | - | - | - |
| .55 | - | 13 | 17 | - | - | - | - | - | - | - | - | 9 |
| .60 | - | 9 | - | - | - | - | - | - | - | - | - | - |
| .70 | - | 37 | 10 | - | - | - | - | - | - | - | - | - |
| .80 | - | 386 | 11 | - | - | - | - | - | - | - | - | - |
| .90 | - | - | - | - | - | - | - | - | - | - | - | - |
| 83.40 | - | 37 | 2 | S.T. | - | - | - | - | - | - | - | - |
| .43 | 16 | 10 | 3 | - | 5 | - | - | - | - | - | - | - |
| .51 | 6 | 14 | 12 | - | - | - | - | - | - | - | - | - |
| .55 | - | - | - | - | - | - | - | - | - | - | - | - |
| .60 | 3 | 32 | - | - | - | - | - | - | - | - | - | - |

1/ First occupancy of "Black Douglas" on regular stations used

2/ First occupancy of "Paolina T." on regular stations used

Table VII (Cont'd)
Record of the Larvae of Hake (Merluccius productus), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|-------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 83.65 | - | - | - | - | - | | | - | - | - | - | - |
| .70 | - | - | - | 27 | 3 | | | - | - | - | - | - |
| .75 | - | - | - | - | - | | - | - | - | - | - | - |
| .80 | - | - | - | - | - | | - | - | - | - | - | - |
| .85 | - | - | - | - | - | | - | - | - | - | - | - |
| .90 | - | - | - | - | - | | - | - | - | - | - | - |
| 87.35 | | 100 | 31 | 6 | | | | - | 3 | | 5 | 2 |
| .40 | 26 | 32 | 32 | | | | | - | | | | 2 |
| .45 | - | - | - | - | | | | - | | | | - |
| .50 | 29 | 390 | | | 3 | | | - | | | | |
| .55 | - | - | - | - | | | | - | | - | | - |
| .60 | 61 | 61 | - | 27 | | | | - | | | | |
| .65 | - | - | - | - | - | | | - | | - | - | - |
| .70 | - | - | - | - | - | | | - | - | - | - | - |
| .75 | - | - | - | - | - | | - | - | - | - | - | - |
| .80 | - | - | - | - | - | | - | - | - | - | - | - |
| .85 | - | - | - | - | - | N.Q. | - | - | - | - | - | - |
| .90 | - | - | - | - | - | | - | - | - | - | - | - |
| 90.28 | | 5 | 2 | S.T. | | | | - | | | | |
| .30 | 9 | 50 | 3 | | | | | - | | 2 | | |
| .37 | 25 | 576 | 10 | 6 | | | | - | | | | |
| .45 | 82 | 162 | 26 | | 3 | | | - | | | | |
| .50 | 433 | N.Q. | 6 | | | | | - | | - | | - |
| .55 | - | - | - | - | | | | - | | | | |
| .60 | 27 | 162 | 12 | 14 | | | | - | - | | - | |
| .65 | - | - | - | - | | | | - | - | - | - | - |
| .70 | 14 | 388 | 23 | 181 | 3 | | | - | - | - | - | |
| .75 | - | - | - | - | | | | - | - | - | - | - |
| .80 | - | - | 31 | 17 | | - | | - | - | - | - | |
| .85 | - | - | - | - | | - | | - | - | - | - | - |
| .90 | - | - | 9 | | | - | | - | - | - | - | - |
| 93.27 | 62 | 7 | 5 | 3 | | | | - | - | - | - | |
| .30 | 34 | 19 | 23 | 5 | 6 | | | - | - | - | - | |
| .35 | - | - | - | - | | | | - | - | - | - | - |
| .40 | 298 | 93 | 48 | | | | | - | - | - | - | 4 |
| .45 | - | - | - | - | 6 | | | - | - | - | - | - |
| .50 | 206 | 251 | | | | | | - | - | - | - | |
| .55 | - | - | - | - | | | | - | - | - | - | - |
| .60 | - | - | 24 | 3 | 3 | | | - | - | - | - | - |
| .65 | - | - | - | - | | N.Q. | | - | - | - | - | - |
| .70 | - | - | 79 | | | | | - | - | - | - | - |
| .75 | - | - | - | - | | | | - | - | - | - | - |

Table VII (Cont'd)
Record of the Larvae of Hake (Merluccius productus), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 93.80 | - | - | - | 23 | | 6 | | - | - | - | - | - |
| .85 | - | - | - | - | | - | | - | - | - | - | - |
| .90 | - | - | - | 14 | | | | - | - | - | - | - |
| .95 | - | - | - | - | | - | - | - | - | - | - | - |
| 97.30 | 24 | 15 | | | | | | - | - | 5 | - | |
| .32 | 34 | 46 | 156 | 6 | | | | - | - | - | - | |
| .35 | - | - | - | - | 3 | | | - | - | - | - | - |
| .40 | 48 | 44 | 69 | 18 | 3 | | | - | - | - | - | - |
| .45 | - | - | - | - | | | | - | - | - | - | - |
| .50 | 233 | 78 | 34 | | | | | - | - | - | - | - |
| .55 | - | - | - | - | | | | - | - | - | - | - |
| .60 | - | - | 50 | 9 | | - | | - | - | - | - | - |
| .65 | - | - | - | - | | - | | - | - | - | - | - |
| .70 | - | - | 31 | 6 | | - | | - | - | - | - | - |
| .75 | - | - | - | - | | - | | - | - | - | - | - |
| .80 | - | - | - | 14 | | - | | - | - | - | - | - |
| .85 | - | - | - | - | | - | | - | - | - | - | - |
| .90 | - | - | - | 24 | 10 | - | | - | - | - | - | - |
| 100.29 | 32 | 245 | 61 | 7 | | | - | - | - | 5 | | |
| .30 | 21 | 112 | 25 | 38 | | | - | - | - | | | 3 |
| .35 | - | - | - | - | | | - | - | - | - | | - |
| .40 | 12 | 38 | 29 | 42 | | | - | - | - | | | - |
| .45 | - | - | - | - | 9 | | - | - | - | - | | - |
| .50 | 3 | 154 | 72 | 6 | | | - | - | - | | | - |
| .55 | - | - | - | - | 3 | | - | - | - | - | | - |
| .60 | | 403 | 69 | 29 | | - | - | - | - | | | - |
| .65 | - | - | - | - | | - | - | - | - | - | | - |
| .70 | | 45 | 78 | 43 | | - | - | - | - | | | - |
| .75 | - | - | - | - | | - | - | - | - | - | | - |
| .80 | | 44 | 45 | 33 | | - | - | - | - | | | - |
| .85 | - | - | - | - | | - | - | - | - | - | | - |
| .90 | - | - | 5052 | 15 | | - | - | - | - | | | - |
| 103.30 | 9 | 140 | 35 | 2 | | | - | - | - | | | 4 |
| .35 | 20 | 1069 | 122 | 284 | | | - | - | - | | | |
| .40 | 12 | 141 | 96 | 349 | | | - | - | - | | | |
| .45 | - | - | - | 73 | | | - | - | - | - | | - |
| .50 | 28 | 268 | 338 | 8 | | | - | - | - | - | | - |
| .55 | - | - | - | 9 | | | - | - | - | - | | - |
| .60 | 151 | 718 | 14 | 93 | 6 | | - | - | - | - | | - |
| .65 | - | - | - | 468 | | | - | - | - | - | | - |
| .70 | - | - | | 173 | | | - | - | - | - | | - |

Table VII (Cont'd)
Record of the Larvae of Hake (Merluccius productus), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 103.75 | - | - | - | 73 | | | - | - | - | - | | - |
| .80 | - | - | - | 48 | | | - | - | - | - | | - |
| .85 | - | - | - | - | | | - | - | - | - | | - |
| .90 | - | - | - | - | | | - | - | - | - | | - |
| 107.32 | 20 | 428 | 50 | 7 | | | - | - | - | | | |
| .35 | 10 | 1263 | 24 | 100 | | | - | - | - | | | |
| .40 | 3 | 113 | 18 | 355 | | | - | - | - | | | |
| .45 | - | - | - | - | | | - | - | - | - | | - |
| .50 | | 27 | 337 | 333 | 3 | | - | - | - | - | | - |
| .55 | - | - | - | - | 3 | | - | - | - | - | | - |
| .60 | | | 144 | 91 | | | - | - | - | - | | - |
| .65 | - | - | - | - | | | - | - | - | - | | - |
| .70 | - | - | 48 | 79 | | | - | - | - | - | | - |
| .75 | - | - | - | - | | | - | - | - | - | | - |
| .80 | - | - | - | 51 | | | - | - | - | - | | - |
| .85 | - | - | - | - | | | - | - | - | - | | - |
| .90 | - | - | - | - | | | - | - | - | - | | - |
| 110.33 | 502 | 2726 | 111 | 16 | | | - | - | - | | | 9 |
| .35 | 206 | 2099 | 92 | 286 | 3 | | - | - | - | | | 5 |
| .40 | 3 | 202 | 13 | 41 | 6 | | - | - | - | | | 4 |
| .45 | - | - | - | - | 3 | | - | - | - | - | | - |
| .50 | 3 | 7 | | 42 | 3 | 3 | - | - | - | | | - |
| .55 | - | - | - | - | | | - | - | - | - | | - |
| .60 | 3 | 18 | 3 | 8 | | | - | - | - | | | - |
| .65 | - | - | - | - | | | - | - | - | - | | - |
| .70 | | 6 | | 5 | | | - | - | - | | | - |
| .75 | - | - | - | - | | | - | - | - | - | | - |
| .80 | | | 360 | | | | | - | - | | - | - |
| .85 | - | - | - | - | | | | - | - | - | - | - |
| .90 | - | - | 187 | | | | | - | - | | - | - |
| 113.30 | | 2028 | 15 | 4 | | | | - | - | | - | 10 |
| .35 | 23 | 2389 | 111 | 53 | | | | - | - | | - | 25 |
| .40 | 8 | 855 | 164 | 69 | | | | - | - | | - | 5 |
| .45 | - | 1909 | 23 | 198 | | | | - | - | - | - | - |
| .50 | 11 | 152 | 28 | 86 | | | | - | - | - | - | - |
| .55 | - | 17 | 223 | | | | | - | - | - | - | - |
| .60 | | 3 | 14 | 11 | | | | - | - | - | - | - |
| .65 | - | - | - | - | | | | - | - | - | - | - |
| .70 | - | | | 40 | | | | - | - | - | - | - |
| .75 | - | - | - | - | | | | - | - | - | - | - |
| .80 | - | - | - | 3 | | | | - | - | - | - | - |

Table VII (Cont'd)
Record of the Larvae of Hake (Merluccius productus), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 117.26 | 65 | 37 | 36 | 28 | | | | - | - | | - | |
| .30 | 505 | 647 | 176 | | | | | - | - | 10 | - | 15 |
| .35 | 1319 | 1832 | 7 | 22 | 5 | | | - | - | | - | 51 |
| .40 | 15 | 192 | 64 | 21 | 3 | | | - | - | | - | |
| .45 | - | 69 | 16 | 49 | 2 | | | - | - | - | - | - |
| .50 | 16 | 50 | 12 | 91 | 2 | | | - | - | - | - | |
| .55 | - | 3 | 364 | 195 | | | | - | - | - | - | - |
| .60 | 4 | | 227 | 23 | | | | - | - | - | - | |
| .65 | - | - | - | - | | | | - | - | - | - | - |
| .70 | - | | | 46 | | | | - | - | - | - | |
| .75 | - | - | - | - | | | | - | - | - | - | - |
| .80 | - | - | - | | | | | - | - | - | - | - |
| 120.25 | 213 | 6 | 13 | | | | | - | - | | - | 2 |
| .27 | - | - | - | - | | | - | - | - | 2 | - | - |
| .30 | 257 | 119 | 140 | 24 | | | | - | - | 4 | - | 38 |
| .35 | 20 | 79 | 4 | 11 | | | | - | - | | - | 30 |
| .40 | 60 | 112 | 3 | | | | | - | - | - | - | 2 |
| .45 | 148 | 27 | | 17 | | | | - | - | | - | |
| .50 | 46 | 4 | 70 | 22 | | | | - | - | | - | |
| .55 | - | | 318 | 3 | | | | - | - | - | - | |
| .60 | | | 15 | 7 | - | | | - | - | | - | |
| .65 | - | - | - | 48 | - | - | - | - | - | - | - | - |
| .70 | | | | | 6 | | | - | - | | - | |
| .75 | - | - | - | | - | - | - | - | - | - | - | - |
| .80 | 3 | | | | | | | - | - | | - | - |
| .90 | | | 6 | - | - | - | - | - | - | | - | - |
| .100 | | | 3 | - | - | - | - | - | - | - | - | - |
| 123.37 | 11 | 5 | 24 | | N.Q. | | | - | - | | - | |
| .40 | 34 | 14 | 27 | | | | | - | - | | - | |
| .45 | 3 | 64 | 9 | | | | | - | - | - | - | - |
| .50 | | | 11 | | | | | - | - | | - | |
| .55 | | | 24 | | | | | - | - | - | - | |
| .60 | - | - | 124 | | | | | - | - | | - | - |
| 127.34 | 3 | 18 | 8 | 4 | | | | - | - | | - | |
| .40 | | 82 | 59 | | 2 | | | - | - | | - | |
| .45 | | 81 | 6 | 9 | | | | - | - | - | - | - |
| .50 | | 77 | 11 | | | | | - | - | | - | |
| .55 | | 11 | 6 | 3 | | | | - | - | - | - | |
| .60 | - | - | 8 | | | | | - | - | | - | - |
| 130.30 | 2 | 4 | 6 | 8 | 11 | | | - | - | | - | |
| .35 | 6 | 80 | 413 | 9 | | | | - | - | | - | 9 |

Table VII (Cont'd)
Record of the Larvae of Hake (Merluccius productus), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 130.40 | 8 | 241 | 67 | 11 | 12 | | | - | - | | - | |
| .50 | | 48 | 24 | | 7 | | | - | - | | - | |
| .55 | - | - | - | | - | - | - | - | - | - | - | - |
| .60 | | | | 2 | | | | - | - | | - | - |
| 133.25 | | N.Q. | 16 | 12 | | | | - | - | | - | |
| .30 | | 8 | 114 | | | | | - | - | | - | |
| .40 | 7 | 453 | 126 | 12 | N.Q. | 3 | | - | - | - | - | |
| .50 | - | - | 96 | | | | | - | - | - | - | - |
| .60 | - | - | | - | - | - | - | - | - | - | - | - |
| 137.23 | | | | | 31 | | | - | - | | - | 3 |
| .30 | 46 | 65 | 35 | | 8 | 7 | 3 | - | - | | - | |
| .40 | | 9 | 8 | 6 | | | | - | - | - | - | |
| .50 | - | - | 50 | | | | | - | - | - | - | - |
| .60 | - | - | 19 | - | - | - | - | - | - | - | - | - |
| 140.30 | 319 | 602 | | - | - | - | - | - | - | - | - | |
| .35 | 6848 | 170 | 18 | - | - | - | - | - | - | - | - | |
| .40 | 7 | 16 | 14 | - | - | - | - | - | - | - | - | |
| .50 | - | - | 3 | - | - | - | - | - | - | - | - | - |
| 143.26 | | 1455 | 572 | - | - | - | - | - | - | - | - | |
| .30 | 33 | 1226 | 25 | - | - | - | - | - | - | - | - | 3 |
| .35 | 6 | 27 | 30 | - | - | - | - | - | - | - | - | |
| .40 | - | - | 2 | - | - | - | - | - | - | - | - | - |
| .50 | - | - | | - | - | - | - | - | - | - | - | - |
| 147.20 | 129 | 33 | 33 | - | - | - | - | - | - | - | - | |
| .25 | 460 | 308 | 62 | - | - | - | - | - | - | - | - | |
| .30 | | 19 | 47 | - | - | - | - | - | - | - | - | |
| .40 | - | - | | - | - | - | - | - | - | - | - | - |
| 150.19 | 13 | | 170 | - | - | - | - | - | - | - | - | |
| .25 | | 26 | 7 | - | - | - | - | - | - | - | - | |
| .30 | | 18 | 15 | - | - | - | - | - | - | - | - | |
| .40 | - | - | | - | - | - | - | - | - | - | - | - |
| 153.16 | | | 2 | - | - | - | - | - | - | - | - | - |
| .20 | | | 4 | - | - | - | - | - | - | - | - | - |
| .30 | N.Q. | | | - | - | - | - | - | - | - | - | - |
| .40 | - | - | | - | - | - | - | - | - | - | - | - |
| 157.10 | | | | - | - | - | - | - | - | - | - | - |
| .20 | | | | - | - | - | - | - | - | - | - | - |
| .30 | | | 3 | - | - | - | - | - | - | - | - | - |
| .40 | - | - | | - | - | - | - | - | - | - | - | - |
| Total | 13356 | 28973 | 12535 | 4757 | 176 | 19 | 3 | - | 3 | 28 | 5 | 235 |

RECORD OF THE LARVAE OF ROCKFISH (SEBASTODES SPP.), 1955

All of the preceding tabulations have dealt with individual species, but a number of species of Sebastes are grouped together in the tabulations of rockfish larvae (table VIII). Rockfish larvae can be identified to genus without difficulty, but no attempt has been made to determine the species composition. There are over 50 species of Sebastes, most of which occur in the area being studied.

Rockfish are temperate water species, decreasing in abundance along the coast of Baja California. The percent occurrence of larvae is higher off California than off Baja California. The percent occurrence decreases markedly between lower central Baja California and southern Baja California. The average number of larvae taken per haul is also higher off California than Baja California. These data are summarized in the following tabulation:

| Station lines | Total samples taken | Occurrences of rockfish larvae | Percent occurrence | Total number of larvae taken | Percent taken in each area | Average number per haul |
|---------------|---------------------|--------------------------------|--------------------|------------------------------|----------------------------|-------------------------|
| 60-77 | 86 | 58 | 67.44 | 2,893 | 10.2 | 33.6 |
| 80-93 | 391 | 250 | 63.94 | 13,503 | 47.8 | 34.5 |
| 97-107 | 290 | 133 | 45.86 | 3,721 | 13.2 | 12.8 |
| 110-120 | 334 | 133 | 39.82 | 6,336 | 22.4 | 19.0 |
| 123-137 | 202 | 75 | 37.13 | 1,796 | 6.3 | 8.9 |
| 140-157 | 72 | 3 | 4.17 | 24 | 0.1 | 0.3 |
| Total | 1,375 | 652 | 47.42 | 28,273 | 100.0 | 20.6 |

Rockfish larvae are collected throughout the year (text table 11). In 1955, the largest numbers were obtained in January, approximately 22.2% of the year's total. The next largest month was February, with 22.0%. February was the month of peak abundance in 1953 and 1954, but April was the peak month in 1951 and 1952, as is shown in the following tabulation:

| Year | Number rockfish larvae | Month of peak abundance | Percent taken in peak month |
|------|------------------------|-------------------------|-----------------------------|
| 1950 | 11,831 | March | 24.8 |
| 1951 | 18,667 | April | 28.8 |
| 1952 | 21,697 | April | 20.8 |
| 1953 | 36,045 | February | 31.0 |
| 1954 | 50,844 | February | 28.4 |
| 1955 | 28,273 | January | 22.2 |

Text table 11.--Occurrence and abundance (standard haul totals) of rockfish larvae
(Sebastes spp.), by month and area, in hauls made during 1955

| Cruise | Central California 60-77 | | Southern California 80-93 | | Northern Baja California 97-107 | | Upper central Baja California 110-120 | | Lower central Baja California 123-137 | | Southern Baja California 140-157 | | Total | |
|---------|--------------------------------|-------------|---------------------------------|-------------|---------------------------------------|-------------|---|-------------|---|-------------|--|-------------|----------------------|-------------|
| | Occur- rences ber | Num- ber | Occur- rences ber | Num- ber | Occur- rences ber | Num- ber | Occur- rences ber | Num- ber | Occur- rences ber | Num- ber | Occur- rences ber | Num- ber | Occur- rences ber | Num- ber |
| 5501 | - | - | 23 | 3,343 | 11 | 796 | 19 | 1,611 | 9 | 528 | 1 | 3 | 63 | 6,281 |
| 5502 | - | - | 20 | 3,301 | 12 | 1,321 | 20 | 1,393 | 10 | 188 | 1 | 3 | 63 | 6,206 |
| 5503 | - | - | 23 | 1,048 | 15 | 561 | 24 | 1,557 | 14 | 469 | 1 | 18 | 77 | 3,653 |
| 5504 | - | - | 29 | 2,029 | 19 | 362 | 22 | 872 | 8 | 270 | - | - | 78 | 3,533 |
| 5505 | 9 | 147 | 34 | 999 | 29 | 249 | 13 | 380 | 10 | 120 | - | - | 95 | 1,895 |
| 5506 | 19 | 466 | 40 | 800 | 19 | 190 | 13 | 128 | 11 | 148 | - | - | 102 | 1,732 |
| 5507 | 17 | 2,124 | 28 | 373 | 17 | 91 | 6 | 52 | 7 | 36 | - | - | 75 | 2,676 |
| 5508 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5509 | - | - | 10 | 140 | - | - | - | - | - | - | - | - | 10 | 140 |
| 5510 | 13 | 156 | 12 | 235 | 6 | 32 | 6 | 22 | 3 | 16 | - | - | 40 | 461 |
| 5511 | - | - | 11 | 1,002 | - | - | - | - | - | - | - | - | 11 | 1,002 |
| 5512 | - | - | 20 | 233 | 5 | 119 | 10 | 321 | 3 | 21 | 0 | 0 | 38 | 694 |
| Total | 58 | 2,893 | 250 | 13,503 | 133 | 3,721 | 133 | 6,336 | 75 | 1,796 | 3 | 24 | 652 | 28,273 |
| Percent | | 10.2 | | 47.8 | | 13.2 | | 22.4 | | 6.3 | | 0.1 | | 100.0 |

Table VIII
Record of the Larvae of Rockfish (Sebastodes spp.), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|-------|------------------|------|------|------|------|------|------|------|------------|------------|------|------|
| | 5501 | 5502 | 5503 | 5504 | 5505 | 5506 | 5507 | 5508 | 1/ 5509 | 2/ 5510 | 5511 | 5512 |
| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
| 60.55 | - | - | - | - | - | 133 | - | N | S | 6 | S | - |
| .60 | - | - | - | - | - | 47 | - | O | P | 6 | P | - |
| .70 | - | - | - | - | - | 26 | - | R | E | 6 | E | - |
| .80 | - | - | - | - | - | 24 | - | P | C | 12 | C | - |
| .90 | - | - | - | - | - | - | - | A | I | 6 | I | - |
| 63.52 | - | - | - | - | 16 | 27 | 168 | C | A | 7 | A | - |
| .55 | - | - | - | - | 2 | 25 | 1196 | - | L | 32 | L | - |
| .65 | - | - | - | - | 5 | - | 81 | - | - | - | - | - |
| 67.50 | - | - | - | - | 21 | 16 | 6 | - | - | 10 | - | - |
| .55 | - | - | - | - | - | 14 | 249 | - | - | 16 | - | - |
| .65 | - | - | - | - | - | 6 | 52 | - | - | - | - | - |
| 70.52 | - | - | - | - | 11 | 11 | 26 | - | - | 15 | - | - |
| .55 | - | - | - | - | 24 | - | 23 | - | - | 17 | - | - |
| .60 | - | - | - | - | 35 | - | 52 | - | - | - | - | - |
| .70 | - | - | - | - | - | 13 | 9 | - | - | - | - | - |
| .80 | - | - | - | - | N.Q. | - | - | - | - | - | - | - |
| .90 | - | - | - | - | - | - | 7 | - | - | - | - | - |
| 73.50 | - | - | - | - | - | 6 | - | - | - | 6 | - | - |
| .60 | - | - | - | - | - | 16 | 10 | - | - | - | - | - |
| .70 | - | - | - | - | - | 18 | - | - | - | - | - | - |
| .80 | - | - | - | - | N.Q. | - | 25 | - | - | - | - | - |
| .90 | - | - | - | - | - | 7 | - | - | - | - | - | - |
| 77.50 | - | - | - | - | - | 6 | - | - | - | 17 | - | - |
| .55 | - | - | - | - | 22 | 58 | 122 | - | - | - | - | - |
| .65 | - | - | - | - | - | 9 | 17 | - | - | - | - | - |
| .70 | - | - | - | - | - | - | 48 | - | - | - | - | - |
| .80 | - | - | - | - | - | - | 33 | - | - | - | - | - |
| .90 | - | - | - | - | 11 | 4 | - | - | - | - | - | - |
| 80.51 | 58 | - | 53 | 41 | 11 | - | 2 | - | - | - | - | 5 |
| .55 | 103 | 691 | 35 | 52 | 28 | 33 | 10 | - | - | - | - | 17 |
| .60 | 22 | 198 | 10 | 214 | 23 | 23 | 29 | - | - | - | - | 8 |
| .70 | 3 | 5 | 91 | 24 | 27 | 6 | 7 | - | - | - | - | - |
| .80 | - | 11 | 57 | 28 | 11 | 5 | - | - | - | - | - | 2 |
| .90 | - | - | - | 3 | - | 13 | 14 | - | - | - | - | 3 |
| 83.40 | 8 | 44 | 6 | S.T. | 24 | - | 6 | - | 2 | 4 | - | 2 |
| .43 | 145 | 610 | 132 | 42 | - | 18 | - | - | - | 3 | - | 5 |
| .51 | 151 | 519 | 12 | 87 | 3 | 12 | 3 | - | 5 | 70 | 246 | 37 |
| .55 | - | - | - | - | - | 6 | 6 | - | 9 | - | 62 | - |
| .60 | 75 | 407 | 150 | 133 | 16 | 22 | - | - | - | 3 | 5 | 12 |

1/ First occupancy of "Black Douglas" on regular stations used

2/ First occupancy of "Paolina T." on regular stations used

Table VIII (Cont'd)
Record of the Larvae of Rockfish (*Sebastes* spp.), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|-------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 83.65 | - | - | - | - | - | 10 | 41 | - | - | - | - | - |
| .70 | - | - | - | 25 | 38 | 42 | 12 | - | - | - | - | - |
| .75 | - | - | - | - | - | 21 | - | - | - | - | - | - |
| .80 | - | - | - | 3 | - | 66 | - | - | - | - | - | - |
| .85 | - | - | - | - | - | 12 | - | - | - | - | - | - |
| .90 | - | - | - | - | - | 12 | - | - | - | - | - | - |
| 87.35 | 235 | 143 | 142 | 34 | 12 | 6 | 50 | - | 38 | 7 | 5 | - |
| .40 | 379 | 23 | 120 | 92 | 10 | 2 | 5 | - | 23 | 3 | 26 | 4 |
| .45 | - | - | - | - | 14 | 31 | - | - | 5 | 3 | 427 | - |
| .50 | 1038 | 123 | 10 | 459 | 39 | 54 | - | - | 6 | 115 | 196 | 75 |
| .55 | - | - | - | - | 100 | 25 | - | - | - | - | 26 | - |
| .60 | 172 | 37 | - | 326 | 34 | 43 | - | - | - | 15 | - | 6 |
| .65 | - | - | - | - | - | 13 | 22 | - | - | - | - | - |
| .70 | - | - | - | 73 | - | 15 | 11 | - | - | - | - | - |
| .75 | - | - | - | - | - | 17 | - | - | - | - | - | - |
| .80 | - | - | - | - | - | 6 | - | - | - | - | - | - |
| .85 | - | - | - | - | - | N.Q. | - | - | - | - | - | - |
| .90 | - | - | - | 3 | - | - | - | - | - | - | - | - |
| 90.28 | 25 | 96 | 11 | S.T. | 3 | - | 33 | - | 39 | 3 | - | - |
| .30 | 11 | 90 | 6 | 38 | 26 | 6 | 2 | - | 10 | 7 | - | 2 |
| .37 | 87 | 119 | 66 | 59 | 3 | 8 | - | - | - | 2 | 2 | 3 |
| .45 | 67 | 25 | 18 | 29 | 53 | - | 3 | - | - | - | 4 | - |
| .50 | 650 | N.Q. | 12 | 110 | 52 | 96 | 4 | - | 3 | - | 3 | - |
| .55 | - | - | - | - | 89 | 79 | 5 | - | - | - | - | 11 |
| .60 | 5 | 38 | 47 | 51 | 73 | 13 | 8 | - | - | - | - | 3 |
| .65 | - | - | - | - | 46 | 14 | - | - | - | - | - | - |
| .70 | 14 | 26 | - | - | 45 | - | - | - | - | - | - | 5 |
| .75 | - | - | - | - | - | - | - | - | - | - | - | - |
| .80 | - | - | - | 4 | - | - | - | - | - | - | - | - |
| .85 | - | - | - | - | - | - | - | - | - | - | - | - |
| .90 | - | - | - | - | - | - | - | - | - | - | - | - |
| 93.27 | 73 | 51 | 37 | 19 | 3 | 16 | 57 | - | - | - | - | 13 |
| .30 | 7 | 45 | 14 | - | 25 | - | 6 | - | - | - | - | 2 |
| .35 | - | - | - | - | 9 | 9 | 2 | - | - | - | - | - |
| .40 | 3 | - | 13 | 10 | 28 | - | - | - | - | - | - | 18 |
| .45 | - | - | - | - | 25 | 6 | 2 | - | - | - | - | - |
| .50 | 12 | - | - | 15 | 102 | 6 | - | - | - | - | - | - |
| .55 | - | - | - | - | 3 | 5 | 5 | - | - | - | - | - |
| .60 | - | - | 3 | 23 | - | 3 | - | - | - | - | - | - |
| .65 | - | - | - | - | - | N.Q. | 17 | - | - | - | - | - |
| .70 | - | - | 3 | 12 | 15 | 20 | 3 | - | - | - | - | - |
| .75 | - | - | - | - | 6 | 6 | 8 | - | - | - | - | - |

Table VIII (Cont'd)
Record of the Larvae of Rockfish (Sebastodes spp.), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 93.80 | - | - | - | 20 | | | | - | - | - | - | - |
| .85 | - | - | - | - | | - | | - | - | - | - | - |
| .90 | - | - | - | | | - | | - | - | - | - | - |
| .95 | - | - | - | - | 3 | - | - | - | - | - | - | - |
| 97.30 | 240 | 66 | 16 | 2 | 18 | 13 | 16 | - | - | - | - | - |
| .32 | 54 | 444 | 18 | 6 | 13 | 6 | | - | - | 3 | - | - |
| .35 | - | - | - | - | 3 | 3 | 9 | - | - | - | - | - |
| .40 | | 100 | 4 | 5 | 15 | | | - | - | - | - | - |
| .45 | - | - | - | - | 7 | | 6 | - | - | - | - | - |
| .50 | | 3 | | 14 | 13 | 16 | | - | - | - | - | - |
| .55 | - | - | - | - | 3 | 10 | 6 | - | - | - | - | - |
| .60 | - | - | | 12 | | - | 3 | - | - | - | - | - |
| .65 | - | - | - | - | 4 | - | | - | - | - | - | - |
| .70 | - | - | | 6 | 7 | - | | - | - | - | - | - |
| .75 | - | - | - | - | 6 | - | | - | - | - | - | - |
| .80 | - | - | - | 3 | 4 | - | 6 | - | - | - | - | - |
| .85 | - | - | - | - | 8 | - | 6 | - | - | - | - | - |
| .90 | - | - | - | | 4 | - | | - | - | - | - | - |
| 100.29 | 82 | 164 | 170 | 34 | 10 | 10 | | - | - | - | - | - |
| .30 | 79 | 53 | 91 | 25 | 10 | 20 | | - | - | 6 | - | 46 |
| .35 | - | - | - | - | | 3 | 3 | - | - | - | - | - |
| .40 | 9 | | 10 | 34 | 17 | 3 | 2 | - | - | - | - | - |
| .45 | - | - | - | - | 12 | 6 | | - | - | - | - | - |
| .50 | | | 3 | 16 | | 13 | | - | - | - | - | 2 |
| .55 | - | - | - | - | | 10 | | - | - | - | - | - |
| .60 | 4 | 18 | 3 | | 3 | - | | - | - | - | - | - |
| .65 | - | - | - | - | | - | | - | - | - | - | - |
| .70 | | | | | | - | 3 | - | - | - | - | - |
| .75 | - | - | - | - | | - | | - | - | - | - | - |
| .80 | | | | | | - | 3 | - | - | - | - | - |
| .85 | - | - | - | - | 6 | - | | - | - | - | - | - |
| .90 | - | - | | | | - | | - | - | - | - | - |
| 103.30 | 159 | 191 | 68 | 74 | 12 | 22 | | - | - | 8 | - | 2 |
| .35 | 12 | 124 | 40 | 4 | 3 | 14 | 3 | - | - | 6 | - | 45 |
| .40 | | | 9 | 8 | | | 3 | - | - | 7 | - | - |
| .45 | - | - | - | | | 12 | 13 | - | - | - | - | - |
| .50 | | | | | 3 | | | - | - | - | - | - |
| .55 | - | - | - | 3 | 6 | | | - | - | - | - | - |
| .60 | | 3 | | 1 | | 9 | | - | - | - | - | - |
| .65 | - | - | - | | | | | - | - | - | - | - |
| .70 | - | - | | | | | | - | - | - | - | - |

Table VIII (Cont'd)
Record of the Larvae of Rockfish (*Sebastes* spp.), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 103.75 | - | - | - | | 9 | | | - | - | - | - | - |
| .80 | - | - | - | | 3 | | | - | - | - | - | - |
| .85 | - | - | - | - | | | | - | - | - | - | - |
| .90 | - | - | - | - | | | | - | - | - | - | - |
| 107.32 | 145 | 89 | 81 | 29 | 26 | | 3 | - | - | | - | 24 |
| .35 | 3 | 66 | 38 | 78 | 12 | | | - | - | 2 | - | |
| .40 | 9 | | 6 | 8 | | 11 | 3 | - | - | | - | |
| .45 | - | - | - | - | 9 | 6 | | - | - | - | - | - |
| .50 | | | 4 | | 3 | 3 | 3 | - | - | - | - | - |
| .55 | - | - | - | - | | | | - | - | - | - | - |
| .60 | | | | | | | | - | - | - | - | - |
| .65 | - | - | - | - | | | | - | - | - | - | - |
| .70 | - | - | | | | | | - | - | - | - | - |
| .75 | - | - | - | - | | | | - | - | - | - | - |
| .80 | - | - | - | | | | | - | - | - | - | - |
| .85 | - | - | - | - | | | | - | - | - | - | - |
| .90 | - | - | - | - | | | | - | - | - | - | - |
| 110.33 | 246 | 212 | 358 | 47 | 45 | 5 | | - | - | | - | 37 |
| .35 | 49 | 71 | 140 | 8 | 28 | 6 | | - | - | | - | 41 |
| .40 | | 16 | | | 19 | | | - | - | | - | |
| .45 | - | - | - | - | | | | - | - | - | - | - |
| .50 | | | | | | | 4 | - | - | 2 | - | - |
| .55 | - | - | - | - | | 2 | 3 | - | - | - | - | - |
| .60 | | | | | | | | - | - | - | - | - |
| .65 | - | - | - | - | | | | - | - | - | - | - |
| .70 | 22 | | | 3 | | | | - | - | - | - | - |
| .75 | - | - | - | - | | | | - | - | - | - | - |
| .80 | 6 | | 9 | | | | | - | - | 3 | - | 6 |
| .85 | - | - | - | - | | | | - | - | - | - | - |
| .90 | - | - | | | | | | - | - | - | - | - |
| 113.30 | 500 | 291 | 122 | 12 | 10 | | 5 | - | - | | - | 206 |
| .35 | 23 | 294 | 249 | 34 | | | | - | - | 4 | - | 13 |
| .40 | 14 | 15 | 25 | 53 | | | | - | - | | - | 3 |
| .45 | - | 3 | 13 | | | | | - | - | - | - | - |
| .50 | 6 | 4 | 16 | | | | | - | - | - | - | - |
| .55 | - | | 7 | | | | | - | - | - | - | - |
| .60 | | | 4 | 8 | | | | - | - | - | - | - |
| .65 | - | - | - | - | | | | - | - | - | - | - |
| .70 | - | | | 18 | | | | - | - | - | - | - |
| .75 | - | - | - | - | | | | - | - | - | - | - |
| .80 | - | - | - | | | | | - | - | - | - | - |

Table VIII (Cont'd)
Record of the Larvae of Rockfish (Sebastodes spp.), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 117.26 | 220 | 89 | 78 | | 37 | 8 | 4 | - | - | | - | 6 |
| .30 | 168 | 47 | 119 | 10 | 25 | 6 | 3 | - | - | | - | |
| .35 | 32 | 151 | 11 | 16 | 16 | | | - | - | 7 | - | 3 |
| .40 | 51 | 112 | 249 | 198 | 148 | 13 | | - | - | | - | |
| .45 | - | 7 | 32 | 22 | 15 | 6 | | - | - | - | - | - |
| .50 | 16 | 6 | | 7 | | 7 | | - | - | - | - | |
| .55 | - | | 8 | 144 | | | | - | - | - | - | - |
| .60 | 4 | | 4 | 6 | | | | - | - | - | - | |
| .65 | - | - | - | - | | | | - | - | - | - | - |
| .70 | - | | | 109 | | | | - | - | - | - | - |
| .75 | - | - | - | - | | | | - | - | - | - | - |
| .80 | - | - | - | | | | | - | - | - | - | - |
| 120.25 | 77 | 6 | | | 11 | | | - | - | | - | |
| .27 | - | - | - | - | | 18 | - | - | - | | - | - |
| .30 | 119 | 17 | 38 | | 9 | 13 | 33 | - | - | 4 | - | |
| .35 | 18 | 37 | 4 | 15 | | | | - | - | | - | |
| .40 | 9 | 11 | 11 | | | 2 | | - | - | - | - | |
| .45 | 31 | 2 | 39 | 84 | | 30 | | - | - | | - | 3 |
| .50 | | | 3 | 57 | | 12 | | - | - | | - | |
| .55 | - | | 15 | 3 | 11 | | | - | - | - | - | 3 |
| .60 | | | | 7 | - | | | - | - | | - | |
| .65 | - | - | - | 11 | - | - | - | - | - | - | - | - |
| .70 | | | | | 6 | | | - | - | 2 | - | |
| .75 | - | - | - | | - | - | - | - | - | - | - | - |
| .80 | | | | | | | | - | - | | - | - |
| .90 | | 2 | | - | - | - | - | - | - | | - | - |
| .100 | | | 3 | - | - | - | - | - | - | - | - | - |
| 123.37 | 212 | 100 | 148 | 92 | N.Q. | | | - | - | | - | 8 |
| .40 | 153 | 14 | 34 | 52 | 15 | 9 | | - | - | 9 | - | 10 |
| .45 | 6 | | 24 | 11 | 14 | | 9 | - | - | - | - | - |
| .50 | 3 | | 4 | 1 | | | 3 | - | - | | - | |
| .55 | 3 | | 3 | | | 12 | 8 | - | - | - | - | |
| .60 | - | - | 13 | | 16 | | | - | - | | - | - |
| 127.34 | 130 | 7 | 5 | 17 | 28 | | | - | - | 4 | - | |
| .40 | 15 | 4 | 2 | | 2 | 11 | | - | - | | - | |
| .45 | | 20 | | | 5 | | | - | - | - | - | - |
| .50 | 3 | 3 | | 2 | 6 | | 3 | - | - | 3 | - | 3 |
| .55 | | 2 | | | | | 2 | - | - | - | - | |
| .60 | - | - | 3 | | | | | - | - | | - | - |
| 130.30 | | | | | | 11 | | - | - | | - | |
| .35 | | 27 | 6 | 78 | | 4 | | - | - | | - | |

Table VIII (Cont'd)
Record of the Larvae of Rockfish (*Sebastes* spp.), 1955

| Sta. | Cruise and Month | | | | | | | | | | | |
|--------|------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | 5501 Jan. | 5502 Feb. | 5503 Mar. | 5504 Apr. | 5505 May | 5506 June | 5507 July | 5508 Aug. | 5509 Sept. | 5510 Oct. | 5511 Nov. | 5512 Dec. |
| 130.40 | | 3 | | 17 | 25 | 3 | | - | - | | - | |
| .50 | | | | | | | | - | - | | - | |
| .55 | - | - | - | | - | - | - | - | - | - | - | - |
| .60 | | | | | | | | - | - | | - | - |
| 133.25 | | N.Q. | 2 | | | 6 | | - | - | | - | |
| .30 | 3 | 8 | 176 | | 3 | | | - | - | | - | |
| .40 | | | 43 | | N.Q. | 10 | 3 | - | - | - | - | |
| .50 | - | - | | | | | | - | - | - | - | - |
| .60 | - | - | | - | - | - | - | - | - | - | - | - |
| 137.23 | | | | | | 73 | | - | - | | - | |
| .30 | | | 6 | | | 7 | 8 | - | - | | - | |
| .40 | | | | | 6 | | | - | - | - | - | |
| .50 | - | - | | | | 2 | | - | - | - | - | - |
| .60 | - | - | | - | - | - | - | - | - | - | - | - |
| 140.30 | | | | - | - | - | - | - | - | - | - | |
| .35 | | | 18 | - | - | - | - | - | - | - | - | |
| .40 | | | | - | - | - | - | - | - | - | - | |
| .50 | - | - | | - | - | - | - | - | - | - | - | - |
| 143.26 | | | | - | - | - | - | - | - | - | - | |
| .30 | | | | - | - | - | - | - | - | - | - | |
| .35 | | | | - | - | - | - | - | - | - | - | |
| .40 | - | - | | - | - | - | - | - | - | - | - | - |
| .50 | - | - | | - | - | - | - | - | - | - | - | - |
| 147.20 | | | | - | - | - | - | - | - | - | - | |
| .25 | 3 | | | - | - | - | - | - | - | - | - | |
| .30 | | | | - | - | - | - | - | - | - | - | |
| .40 | - | - | | - | - | - | - | - | - | - | - | - |
| 150.19 | | | | - | - | - | - | - | - | - | - | |
| .25 | | | | - | - | - | - | - | - | - | - | |
| .30 | | | | - | - | - | - | - | - | - | - | |
| .40 | - | - | | - | - | - | - | - | - | - | - | - |
| 153.16 | | | | - | - | - | - | - | - | - | - | - |
| .20 | | | | - | - | - | - | - | - | - | - | - |
| .30 | N.Q. | | | - | - | - | - | - | - | - | - | - |
| .40 | - | - | | - | - | - | - | - | - | - | - | - |
| 157.10 | | | | - | - | - | - | - | - | - | - | - |
| .20 | | | | - | - | - | - | - | - | - | - | - |
| .30 | | 3 | | - | - | - | - | - | - | - | - | - |
| .40 | - | - | | - | - | - | - | - | - | - | - | - |
| Total | 6281 | 6206 | 3653 | 3533 | 1895 | 1732 | 2676 | - | 140 | 461 | 1002 | 694 |

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